# SHORTENING THE PROJECT LIFE CYCLE IN INFORMATION TECHNOLOGY AND TELECOMUNICATION PROJECTS

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# PREFACE AND ACKNOWLEDGMENTS:

This thesis represents the last and most important assignment during my two years of project management studies at NTNU. For me, this master's thesis represents the closing stage of a period of knowledge acquisition gained through challenges, dedication, hard work and constant motivation.

I would like to express my gratitude to my supervisor Bjørn Andersen, co-supervisors Alexander Langlo and Siri Bøe, who patiently and opportunely guided me through this challenge.

I would like to acknowledge all the support provided by the telecommunications company that I used in this case study - level (3). I would also like to acknowledge all those in level (3) who collaborated with me in order to carry out the case study.

Last but not least, I would like to thank my family and friends that encouraged me to keep going and do my best during these two years of master's studies.

Alejandro Florian Buitrago
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# Summary

The motivation for this thesis is based on the fact that telecommunications projects have increased their complexity; nowadays, customers claim for the implementation of large solutions including multiple vendors, software and hardware with highly customizable features and short deadlines that continuously challenge project managers and telecommunications practitioners to create value for their customers.

This thesis focuses on the description of current practices in the telecommunications industry and how these practices can be improved in order to achieve a time reduction in a project's lifecycle.

This research is based on a case study of a company from the telecommunications sector in Colombia. The company is called level (3) and they deliver and operate services using frameworks widely used in this sector.

I use a qualitative approach based on the collection of data from semi-structured interviews. For the data analysis, I use the triangulation technique to find relationships between theory, standard practices and practices in real life.

The theoretical conclusions reveal the relationship between ITIL and PMBOK, ITIL recognizes that the service transition stage should be executed under project management. PMBOK links projects with their product lifecycle by explaining that a phase in a product's life cycle can be carried out as one project or as multiple projects.

Practical conclusions reveal that the three most important measures that the company must implement to shorten the project life cycle are: first, improving the workflow; second, managing project communication and service assets; and third, configuration management.
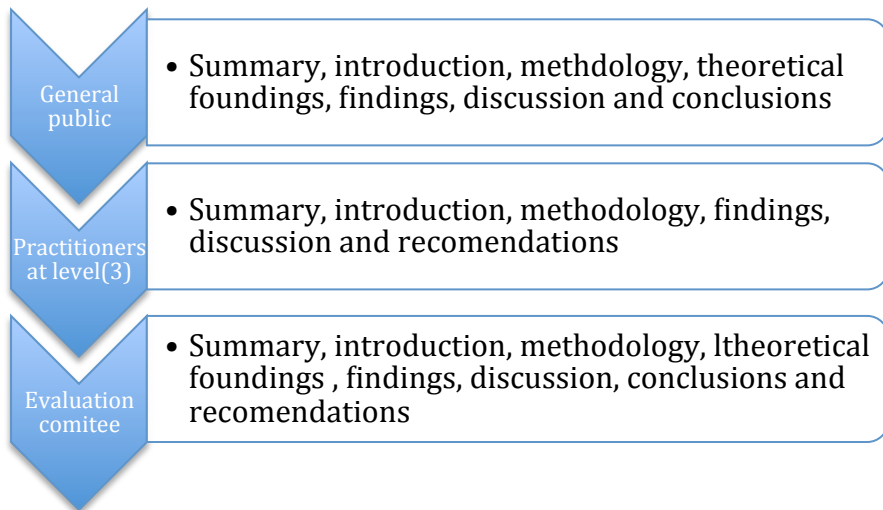
# READERS GUIDE

This master's thesis is addressed to three groups:

Evaluation committee: This committee is made up of those who will judge my master's thesis including my supervisor and co-supervisors.

Practitioner at level (3): The people at level (3) that helped me through the research period and who are interested in the reduction of the project lifecycle.

General public: Those colleagues, students and researchers who share the common interest of time reduction in telecommunications projects.

According to the interest of the reader, this master's thesis can be read according to the following scheme:

| General public | • Summary, introduction, methdology, theoretical foundings, findings, discussion and conclusions |
|---|---|
| Practitioners at level(3) | • Summary, introduction, methodology, findings, discussion and recomendations |
| Evaluation comitee | • Summary, introduction, methodology, ltheoretical foundings , findings, discussion, conclusions and recomendations |

This master's thesis is composed of six chapters, four of them follow a structure consisting of three sub-sections: first an introduction that talks about the topic which will be addressed in the chapter; second, the content of the chapter; and third, a summary of the chapter.

Methodology chapter: In this chapter I describe the research methods that I used in this master's thesis. This chapter contains the explanation and justification of the research methods, a description of the case study, a description of data collection techniques, its reliability and a validity assessment.

Theoretical foundings: In this chapter I describe the two frameworks that the company in the case study use for their projects, these frameworks are PMBOK and ITIL. From the PMOBOK framework I cover: definition of projects, project phases, organizational structure, processes, knowledge management areas and the relationship between process and project management areas.

I cover the following topics from the ITIL framework: general definitions used in the framework, the product life cycle and its phases, processes defined in the framework and the relationship between the phases of the framework and the processes.

Findings: In this chapter I start with the presentation of the company and present their service portfolio. After that, I describe the project lifecycle including the role description and a RACI matrix mapping the roles and tasks in detail. I present the findings according to the data collected in the interviews and rank the findings to discuss the three most relevant ones in the discussion chapter.

Discussion: I base the discussion on the three most relevant findings. I use the triangulation technique to present the relationship between current practices, internal standards and frameworks that the company wants to achieve.

There are two additional chapters in this master's thesis but they do not follow the same structure that the other chapters do: conclusions and recommendations do not have an introduction and summary.

Conclusions: In this chapter I explain whether or not the research questions were answered and the extent in which these questions were answered.

Recommendations: In this chapter I use the findings to come up with ideas to reduce the time of the project lifecycle.

# LIST OF DEFINITIONS

Some of the terms that I will use in the project life cycle description are related to telecommunications; in the following section I reference a short definition to help contextualize the reader. If the reader wants to go into more details, there are several telecommunications books to consult that describe every topic in depth.

*Backbone ip*: Is the part of the network that carries all high density traffic (Mazda and Mazda, 2012). In level (3) they call it BACKBONE IP and it interconnects all customer traffic.

*Backups channel:* This is a communication channel that starts working when the main channel fails. Depending on the network topology of the customers, the backup can be a communications channel from another carrier with the same bandwidth or a modest VPN through the Internet.

*BPE (Business Process Efficiency):* This is a task in the CRM that starts two additional workflows: one for the execution and configuration of the service and the other for administrative and billing purposes.

*Carrier*: It is a company that provides telecommunications services for example WAN connectivity or Internet access.

*Communication channel:* This is a path along which a signal is transmitted from one user to another(Mazda and Mazda, 2012). The branch offices and facilities of a customer use communication channels to access IT resources like software, databases, email, voice over IP (VoIP) and the Internet.

*CPE* (Customer Premise Equipment): Telecommunications equipment located in the customer's premises (Mazda and Mazda, 2012). In most cases this equipment works as a boundary between the LAN and the WAN and belongs to the carrier.

*CRM:* Customer Relationship Management is a model for managing a company's interaction with current and future customers, involving the use of technology to organize, automatize and synchronize sales, marketing, customer service and technical support(Shaw, 1993).

*CVS* (Concurrent Version System): This is software used to save configurations in plain text of the CPE.

*Dokuviz*: Is the enterprise resource planning ERP at LEVEL (3)

*doku order or dko:* This is a task in Dokuviz.

*DRP (*Disaster Recovery Plan): This is an IT plan that companies that work with sensitive information use to continue running their business in case a disaster occurs. The most common case is that the company allocates an identical set of up-dated servers in another geographic area.

*ERP (Enterprise Resource Planning)*: Integrates internal and external management of information across an entire organization—embracing finance/accounting, manufacturing sales and service, customer relationship manager, etc. (Bidgoli, 2004).

*LAN* (Local Area Network): All the computers, servers and switches that the customer has in a limited area. LANs have a higher transfer-rate than WANs and LANs do not require hiring external communications infrastructure.

*Monitoring*: To observe network events that occur without interfering with them. (Mazda and Mazda, 2012)

*Netflow*: Netflow is a network protocol used to collect traffic information, this protocol provides detailed information about the traffic like: source IP address, destination IP address and source and destination ports (UDP or TCP). Level (3) configures this protocol when the customer purchases

Network Management WAN optimization and Network Management application visibility.

NETRAC: It is a network-monitoring product offered by teoco™, Level (3) uses this product to monitor the CPE in Network Management. Nowadays level (3) is migrating from an old platform to NETRAC, this change enables the engineers at the help desk to see detailed information about alarms and high consumption before the CPE or channel fails.

NETVIEW: or Tivoli™ NetView™ is another monitoring tool that Network Management uses.

*Network topology*: Physical and logical configuration of a network (Mazda and Mazda, 2012)

RFP: Request for Proposal.

*Routing*: Technique used to send information from a source address to a destination address (Mazda and Mazda, 2012) using the telecommunications infrastructure.

L*oopback*: This is a routing address that is associated to a logical interface. This is used in the CPE for many routing purposes; in the case where the loopback interface is not reachable, an alarm appears in the monitoring platform.

*Siebel*: It is a customer relationship manager software. It is a model for managing a company's interaction with current and future customers, involving the use of technology to organize, automatize and synchronize sales, marketing, customer service and technical support(Shaw, 1993). Level (3) uses this software to create and update the tickets for incidents, problems or change requests associated to the services purchased by their customers.

*SNMP (Simple Network Management Protocol)*: This is the protocol used to manage communications networks (Mazda and Mazda, 2012). Most of the monitoring tools use it or some

newer version like SNMP V2 that have more features such as encryption.

*TIER 1*: According to PC magazine, "A top-level network on the Internet. There are about a dozen Tier 1 networks, most of which are in the U.S., including AT&T, Global Crossing, Level 3, Qwest, Sprint and Verizon (originally UUNET). Known as "settlement-free peering," Tier 1 networks are private networks that allow traffic from other Tier 1 networks to transit their backbones without a fee."

*Trouble ticket*: Is an element within the CRM linked to an incident, problem or change requirement where the technical staff inside the company (in this case level (3)) updates information like the status, finalization or delegation of another area. Most of the CRM has a web interface that enables the customer to read what has been done so far.

UMONITOR: Network Monitoring Software.

*VPN* (Virtual Private Network):, In this network the Internet or the public switched telephonic network works as part of the customer's private network. (Mazda and Mazda, 2012). As the traffic goes across the Internet, the VPN must set a secure communications channel so that the information going through it can reach the final destination without any modification or access from an outsider. VPNs are used for remote access and in some cases as secondary routes if the main channel fails.

WAN (Wide Area Network): Data communications network that covers geographically separated areas. (Mazda and Mazda, 2012). From a practical perspective, a WAN is a communications channel - provided by an external company - that connects remote locations.

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# 1. INTRODUCTION

In this chapter I will explain the research background and research objectives of this mater's thesis.

In section 1.1, I will emphasize how telecommunications companies aim to implement best-in-practice-frameworks to deal with complex telecommunications projects while optimizing resources to reduce the project life cycle.

In section 1.2, I will describe the research problem and objectives of this master's thesis. I will also describe the relationship between this mater's thesis and ongoing collaborative research between NTNU and SINTEF about shortening the project lifecycle.

## 1.1. Research background

The current condition of the telecommunications market has increased the need for better project management practices in order to reduce prices, deal with increased project complexity and decrease the execution time of projects.

Some years ago, most telecommunications projects were limited to the installation of stand-alone hardware such as "black boxes". Solutions like point-to-point radio links, the installation of optical fiber networks and the design and implementation of disaster recovery plans (DRP) were within the typical scope of telecommunications projects.

Today, hardware components have become more and more customizable. Through the use of software and firmware features, customers have the possibility to choose features according to their needs. These possibilities are becoming a requirement for telecommunications projects.

Nowadays, what we see is that the installation of stand-alone

hardware solutions at a customer's site is becoming obsolete. Instead of that, solution provisioning is being increasingly asked for (Frisanco et al., 2008).

Another important issue is that most of the solutions work as part of multivendor scenarios. There are few cases where all the hardware and software used in a project belong to the same vendor. Working in multivendor scenarios means that those whom offer the best-in-class product become the provider of the portion. That leads to a high level of specialization, vertical disintegration and consolidation of the supply market for the individual portions (Frisanco et al., 2008).

Multivendor scenarios and the need for high customization demand increasing skill of the service department as well as a full understanding of the technologies used in every solution. This new scenario has represented a change in project management skills and expertise. In the past, project managers of telecommunications projects interacted with the sales, engineering and production departments. Nowadays, project managers have to interact with the internal department, contractors and subcontractors to guarantee that all the components in the solution work together as a whole unit meeting the customizations required by the customer.

The increasing complexity of telecommunications projects does not mean that the project life cycle for new services increases. Instead, telecommunications companies have to figure out how to optimize their resources by adopting project management techniques that lead to successfully executing highly complex projects while reducing the project life cycle.

According to the information provided by the telecommunications practitioners as part of this research, in Colombia, most of the customers of ICT companies require two methodologies for their services: **PMBOK** for the project life cycle of the new services and once the services are fully operational, most of the customers want **ITIL** for the life cycle management of the service. As part of the introduction I will

define project life cycle, PMBOK, service life cycle and ITIL.

Project life cycle: According to the PMI institute, a project lifecycle is a collection of generally sequential and sometimes overlapping project phases whose name and number are determined by the management and control needs of the organization or organizations involved in the project, the nature of the project itself, and the area of application. A life cycle can be documented with a methodology. The project life cycle can be determined or shaped by the unique aspects of the organization. (PMBOK, 2008)

PMBOK: Guide to the Project Management Body of Knowledge (PMBOK ® Guide) is a recognized standard for the project management profession. A standard is a formal document that describes established norms, methods, processes, and practices. The knowledge contained in this standard evolved from the recognized good practices of project management practitioners who contributed to the development of this standard. (PMBOK, 2008)

Service lifecycle: It is the set of stages that a service goes across. In the ITIL framework, the service lifecycle is composed by these stages: service strategy, service design, service transition and service operation and continual service improvement.

ITIL: The Information Technology Infrastructure Library (ITIL) framework offers a systematic approach to the delivery of quality IT services. It gives a detailed description of most of the important processes in an IT organization, and includes checklists for tasks, procedures and responsibilities which can be used as a basis for tailoring to the needs of individual organizations. (Van Bon et al., 2007)

The Information Technology Infrastructure Library (ITIL) framework consists of five publications, which detail the content of the service lifecycle. Each publication covers a lifecycle stage, and each lifecycle stage shows how processes

are used to improve service management in an organization. (Gallacher and Morris, 2012).

ITIL is recognized worldwide as a best-practice approach for delivering IT services and IT service management. The main reason for its widespread adoption is that it is based on a practical approach to service management, utilizing what works in real organizations. The guiding principle behind the framework is to ensure that all efforts have a common goal: to deliver IT services that support the requirements of the business by delivering value to the organization. (Gallacher and Morris, 2012)

ITIL and PMBOK are frameworks based on best practices from multiple industries from the public and private sector. PMBOK is recognized as a standard for projects and ITIL is recognized worldwide as a best-practice approach for delivering IT services and IT service management. By aligning the tasks and processes of the product and project life cycle to these frameworks, companies aim to achieve a reduction in the project life cycle.

## 1.2. Research problem and research objectives

As I mentioned before, this master's thesis is part of an ongoing research project about shortening the project life cycle. The research problem and research objectives in my thesis address the project life cycle in telecommunications companies.

In the following I will define the research problem as well as the research objectives. In the chapter on methodology the reader can find a detailed explanation about the techniques and procedures that I used in order to solve the research problem. I will talk about the objectives in this section.

Research problem: I started working on the shortening of project life cycles in the fall semester of 2012 as a part of a project specialization course at NTNU. From this course I attained both theoretical knowledge and insight that has helped me focus on the research problem in this thesis. With the help of my supervisor, we redefined my research problem as:

"Describe current practices in IT projects concerning shortening of the project life cycle and identify the potential for further improvements".

In order to get a better understanding, have a better outcome and limit the scope, my supervisor and I defined the followings research objectives:

- Undertake a literature review of theories and approaches with relevance and interest to the problem to be addressed by this thesis.

- Carry out a case study to describe current practices, methods, measures and techniques being applied in order to shorten the life cycle of telecommunications

projects. What are the potential effects to the project life cycle concerning each measure?

- Describe the different processes and phases of an IT project and identify which has the highest potential for and the greatest effect on reducing the life cycle.

- Evaluate if there are any organizational support tools for IT projects or functions that are vital for shortening the project life cycle.

At the beginning, there was an additional research objective:

"Evaluate the role and responsibility of the project management office when it comes to implementing and executing actions that may reduce the project life cycle."
In the end, my supervisor and I agrees on not including this research objective as part of the thesis because it deviates from the scope of shortening the project life cycle to include the project management office.

By presenting the research questions and research objectives in the introduction, it allows the reader to develop an understanding of the outputs that this thesis should provide at an early stage.

# 2. METHODOLOGY

In this chapter I will explain the methodology I used for my master thesis. I will provide emphasis on: the selection of the qualitative over quantitative approach, a case study description, data collection techniques and a reliability and availability assessment. This explanation has two objectives: to describe and justify to the reader the techniques and procedures used in this thesis and to offer elements, which can be reproduced by research colleagues as similar to this research as possible.

Let's start with a short definition of research design: according to yin "Research designs are logical blue prints, the logics involve the links among the research questions, the data to be collected, and the strategies for analyzing the data. (Yin, 2010).

## 2.1. Qualitative Approach VS Quantitative Approach

In research there are two major paradigms: the traditional research paradigm and the interpretivist research paradigm (Cryer, 2006). The traditional research paradigm relies on statistical treatment of large amounts of data, in this research style the reliability and validity are high because the variables can be easily identified, isolated and measured. This style of research is valid to answer "what is happening" questions (Cryer, 2006), and do some forecasting for future trends. What this style of research cannot do is explain why something happens.

On the other hand, the interpretivist research paradigm works with small amounts of data and the variables can not be clearly identified measured or isolated (Cryer, 2006), in this style data gathering is descriptive but it excludes the use

of qualitative resources, the emphasis is on exploration and insight rather than experiment and the mathematical treatment of data. This research style is useful to solve how and why something is happening. When researchers use the interpretivist approach it means that truth is a conclusion based on the power of arguments given by the writer and how convincing they are (Cryer, 2006)

The research question in this thesis is descriptive and the variables associated to the project life cycle cannot be isolated one by one in order to provide a quantitative approach. I mean that I cannot do several experiments at the same time, for example running one project under the PMBOK approach and another under the ITIL approach and so on. Experiments like this take more resources such as time and money and are simply beyond the resources available for this thesis. Therefore, I will use a qualitative approach according to the time and resources I have. I have chosen to use the qualitative approach for data collection because by completing interviews and using observations from work in the field, I will be able to use a descriptive approach to answer the following research questions.

## 2.2. Case Study Description:

I choose a telecommunications company because both my academic background and my previous work experience relate to telecommunications.

At the beginning, I was planning on working with a Norwegian telecommunications company but unfortunately it was not possible because I do not have any connections to companies in this sector here in Norway.

I decided to use the connections I have in Colombia and I was able to find two telecommunications companies to work with. One of them is level (3) and the other one is ACT telematica.

ACT telematica is a Colombian company that provides manpower and engineering services to bigger ICT companies like Nokia, Telmex, Movistar, Siemens and Huawei among others. Level (3) is an international company with branches in five continents dedicated to providing communication services like the Internet, data center solutions and Voice over IP (VoIP).

I choose level (3) for two reasons: firstly, I had worked with them on projects before, so I know how they run projects and secondly, because of my previous work within the company it will be easier for me to interview stakeholders and gain access to the right people.

I did not choose ACT telematica because I did not have as many contacts and knowledge about the internal processes at the company. A lack of face-to-face contact can generate poor trust between the interviewee and the interviewer. Trust between those involved is reduced even more if we take into consideration that there was no previous interpersonal relationship.

The selection of a Norwegian company represented a higher risk because I did not know what it would involve to contact the company and how willing they would be to cooperate with my research.

Because of the aforementioned reasons I choose the safest option and choose a company that I already had a previous relationship with, rather than choosing a company where I had no certainty about their willingness to cooperate with my research.

The details of the interview can be found in the annex A1 to A5.

## 2.3.    Data Collection Techniques

For this research I am going to use two mechanisms for data collection according to the nature of the data. For the collection of primary data I will use Qualitative interviews (Yin, 2010) and for supplementary data I will use a comprehensive literature review (Yin, 2010). The compilation of this research is framed by the duration of an academic semester; therefore 189 man-hours will be dedicated to the literature review and 87 hours for the interviews.

### 2.3.1.  Qualitative interviews:

According to Robert Yin, "Qualitative interviews aim at understanding participants "on their own terms and how they make meaning of their own lives, experiences, and cognitive processes" (Brenner, 2006, p. 357). " (Yin, 2010). The research objective for this thesis is to investigate and describe the current practice of information technology/telecommunications projects regarding the reduction of the project life cycle and the potential for further improvement. This kind of interview will enable me to get a deeper understanding of the current practices of IT/telecommunications projects that are reported by those interviewed.

I will interview an experienced engineer that has a good understanding of how the projects in the company work. Using this information, I will provide a general description of the stages of the project lifecycle.

After creating the general description of the PLC, I will interview the stakeholders involved in the different stages of the PLC. By doing this, I will gather information in order to compare two things: first, the guidelines defined by the company in real life, and second, and the frameworks that the company uses in real life.

I will also use the interviews to identify the models and tools the company uses for their projects. I will use this information to choose the main topic for the literature review and present the methods the company uses to run their projects to the reader. I will also use theory as part of the triangulation research technique.

In qualitative research, purposive and other kinds of sampling are likely to be chosen in a deliberate manner known as purposive sampling. The goal or purpose of selecting the specific study units is to be able to yield the most relevant and plentiful data, given the topic (Yin, 2010).

In this case, I will use the sample of internal stakeholders involved in the project life cycle to achieve a broader range of information and perspectives.

### 2.3.2.  Literature review:

Robert Yin defines two types of literature review: selective review and comprehensive review. A selective review is focused on those studies that are similar to the one you are about to start (Yin, 2010), the objective being to find "what has not been written" or finding a better methodology which could be used in your research. On the other hand, a comprehensive review focuses on bringing together what is known about a particular topic (Yin, 2010).

Throughout this research, I will use both techniques. I will use the comprehensive review to get ideas about the methodology used in similar studies and the comprehensive review to contextualize and guide the reader across the frameworks, tools and definitions I will use later on.

I will explain how I came up with the topics for the literature review from the inductive versus deductive approaches.

The Inductive approach tends to let the data lead to the emergence of concepts; the deductive approach tends to let

the concepts—if only taking the form of initial "categories" (which are another common form of concepts)—lead to the definition of relevant data that needs to be collected (Yin, 2010).

I will use the deductive approach; by focusing on the interviews, I will discover the relevant topics.

## 2.4.    Reliability And Validity Assessment

As Pat Cryer mentioned, "when researchers can repeat a piece of research and obtain precisely the same results, the results are said to be entirely reliable" (Cryer, 2006). However, I am using qualitative methods and therefore the reliability will never be 100%, as people, circumstances and practices change there is a low probability that another researcher will do the same research at the same company and obtain the same results.

What is validity? According to yin, "A valid study is one that has properly collected and interpreted its data, so that the conclusions accurately reflect and represent the real world (or laboratory) that was studied" (Yin, 2010)
Maxwell highlights the issue of validity by referring to "the correctness or credibility of a description, conclusion, explanation, interpretation, or other sort of account." (1996, p. 87). (Yin, 2010), based on his own work and other qualitative studies, Maxwell summarized seven practices for addressing validity:

Joseph Maxwell (2009, pp. 244– 245) offers a seven-point checklist to be used in combating the threats to validity (Table 1.)

| 1 Intensive long-term [field] involvement | To produce a complete and in depth understanding of field situations, including the opportunity to make repeated observations and interviews. |
| --- | --- |
| 2 "Rich" data | To fully cover the field observations and interviews with detailed and varied data. |
| 3 Respondent validation | To obtain feedback from the people studied, to reduce the misinterpretation of their self-reported behaviors and views. |
| 4 Search for discrepant evidence and negative cases | To test rival or competing explanations. |
| 5 Triangulation | To collect converging evidence from different sources. |
| 6 Quasi-statistics | To use actual numbers instead of adjectives, such as when claiming something is "typical," "rare," or "prevalent". |
| 7 Comparison | To compare explicitly the results across different settings, groups, or events. |

Table 1 Validity Threats (Yin, 2010)

In my research I will use three techniques including rich data, respondent validation by feedback and triangulation.

*Feedback:* Choices Locke and Velamuri (2009) have made a helpful compilation of your likely choices. For instance, they point out that the motives for sharing work with participants relates both to the corrections and changes that will increase the validity of a study (also see the reference to "respondent validation" in Vignette 4.1) and to the need to reinforce the collaborative and ethical relationships with participants (Locke & Velamuri, 2009, pp. 488– 489).

*Feedback from the participants:* I will send drafts of the interviews to the participants in order to receive their approval and to reduce bias and misinterpretations between what they say and what I understand. The drafts of the interviews are in annex A1 to A5.

*Triangulation:* In research, the principle pertains to the goal of seeking at least three ways of verifying or corroborating a particular event, description or fact being reported by a study. Such corroboration serves as another way of strengthening the validity of a study. (Yin, 2010)

I will use the triangulation technique using three elements: first, the standards or frameworks that the company uses for their processes or frameworks and those standards that they would like to use; second, the internal guidelines or documents and tools that the company uses during the project life cycle; and third, a description of what the project life cycle is like when it becomes a reality.

I was thinking of interviewing more than two stakeholders in order to have two different perspectives, but it was not possible because of a lack of availability.

*Discussion of the findings:* I will discuss the most relevant findings using rival theories and triangulation in order to increase the validity of my thesis.

In order to increase the validity of the thesis, I will interview stakeholders from all the life cycle stages and compare their answers with theory and internal procedures. As I have some previous experience working at this company and have an understanding of their business practices, the recommendations that will be presented in this thesis will be both solid and realistic. Potential effects on the shortening of the lifecycle are included in the scope of this research because of previous observations and a good understanding about how level (3) runs their projects, the validity of this research increases.

# 3. THEORETICAL FOUNDINGS:

According to the interview given by the operations manager at the Network Management department in level (3), there is a trend in Colombia in the official sector and in the private sector as well, to include the PMBOK (Project Management Body of Knowledge) practices for the implementation of services and ITIL (The Information Technology Infrastructure Library) for the operational phase of projects.

Both frameworks have similarities regarding planning, resource optimization, avoiding reworking and so on. Level (3) should guarantee a smooth transition between the design, execution phases of the project running under the PMI framework, and the operational phase of the service according to the ITIL framework.

This chapter will cover the theoretical background and definitions from both frameworks. Most of the theory from the PMBOK section was taken from the PMBOK ® Guide. Theory from the ITIL frameworks were taken from an ITIL certification guide but not from the official certification guides for the ITIL foundations exam.

## 3.1. ITIL

ITIL (Information Technology Infrastructure Library): This library is recognized worldwide as a best-practice approach for delivering IT services and IT service management. It focuses on the processes, functions, and capabilities required to support IT services in business (Gallacher and Morris, 2012). The internal stakeholders apply ITIL along the service life cycle.

In this section I am going to start with the definition of some relevant terms for the ITIL framework, in some of the cases these definitions will overlap with the definitions given in the list of definitions section of this master's thesis. It is not my intention to confuse the mind of the reader with two sets of definitions. Instead of that, I will group and define terms that are mandatory for an understanding of the ITIL framework and that will be used in this document for the right interpretation of the framework. For the other part of the thesis the reader can keep using the definitions given in the list of definitions.

After the definitions I will go through a brief description of the phases of the framework and how they are conformed. Once the reader has an overall perspective of the framework, I will explain its phases making emphasis on those who are related to the project life cycle.

Those readers who want to go into more detail about the framework can use these references: (Gallacher and Morris, 2012), (Van Bon et al., 2007) or go to the ITIL web site (http://www.itil-officialsite.com/) and purchase the official material where it is possible to find material on the particular topic desired.

I will conclude this section with a summary.

### 3.1.1. DEFINITIONS:

*Services:* means of delivering value to customers, by facilitating the outcomes customers want to achieve, without the ownership of specific costs and risks (Gallacher and Morris, 2012).

*Service Asset:* Any resource or capability that could contribute to the delivery of a service. Examples include a virtual server, a physical server, and the knowledge in the support team to fix the server.

*Configuration Item:* A service asset that needs to be managed in order to deliver an IT service. All CIs are service assets, but many service assets are not configuration items.

*CMDB (configuration management data base):* Overarching system of tools and databases, used for managing all information relating to service management knowledge throughout the service lifecycle. (Gallacher and Morris, 2012)

*Stakeholders:* Are those that have an interest in an organization, service or project and are potentially interested or engaged in the activities from service management. (Gallacher and Morris, 2012)

ITIL defines three main stakeholders:

*Customers:* Individuals or groups that buy goods or services. They agree and define targets in the service level agreements (SLA) with the IT service provider. They also have financial authority regarding the services provided by the IT service provider (Gallacher and Morris, 2012).

*Users:* Those individuals or groups that use the service on a day-to-day basis. They have no overall authority over the service. (Gallacher and Morris, 2012)

*Suppliers:* Third parties responsible for the supply of goods or services that are required to deliver IT services. (Gallacher and Morris, 2012)

*IT service management (ITSM):* The implementation and management of quality IT services that meet the needs of the business. IT service management is performed by IT service providers by an appropriate mix of people, process and information technology.

This definition is very important because the department we are working with in level (3) is oriented towards delivering IT services. Those services are going to operate under the ITIL framework.

*IT service provider:* A service provider that provides IT services to internal or external customers (Gallacher and Morris, 2012)

*Process:* A structured set of activities designed to accomplish a specific objective. It takes one or more defined inputs and turns them into defined outputs. (Gallacher and Morris, 2012). When the processes are well implemented, they can provide measures and metrics that at the same time become feedback for continuous improvement.

*Service life cycle:* The service lifecycle is an organization model providing insight into:

The way service management is structured.
The way the various components are linked to each other.
The impact that changes in one component will have in other system components and on the entire system

*Service Design Packet (SDP):* The service design packet consists of one or more documents, produced during the service design stage, that describe all aspects of the service, throughout its lifecycle. It contains all the necessary information that will be used to transition and operate the service. (Gallacher and Morris, 2012)

*Service level requirements (SLRs):* SLRs represent what the customer needs for a particular aspect of the service, SLRs base on business objectives. (Gallacher and Morris, 2012).

*Service level agreement: SLA:* Describes parameters by which the delivery of that service will be judged. It specifies as well what is provided and what is not provided. This applies to both sides: any commitment from the customer side should be included in the SLA. The SLA is a written agreement; all parties to the agreement, including the service provider and the customer, should sign it. (Gallacher and Morris, 2012)

*Operational-level agreements (OLAs):* Agreements between internal support departments or other internal departments who are supplying an element of the service. (Gallacher and Morris, 2012).

*ROL:* Group of responsibilities, activities and authorities assigned to a person or team. The role is defined in a process or function. (Gallacher and Morris, 2012)

*Change:* The addition, modification or removal of anything that could have an effect on IT services (Gallacher and Morris, 2012).

### 3.1.2.  OVERVIEW OF THE FRAMEWORK AND LINK BETWEEN PHASES:

As it is shown in Figure 1, the ITIL framework is a set of phases interconnected to one another surrounded by an overall principle of continual service improvement. Service strategy is the core of lifecycle management. The phases of service design, service transition and service operation implement the strategy starting in the service strategy phase. The continual service improvement phase stands for learning

and improving based on the strategic objectives in the organization. (Van Bon et al., 2007)
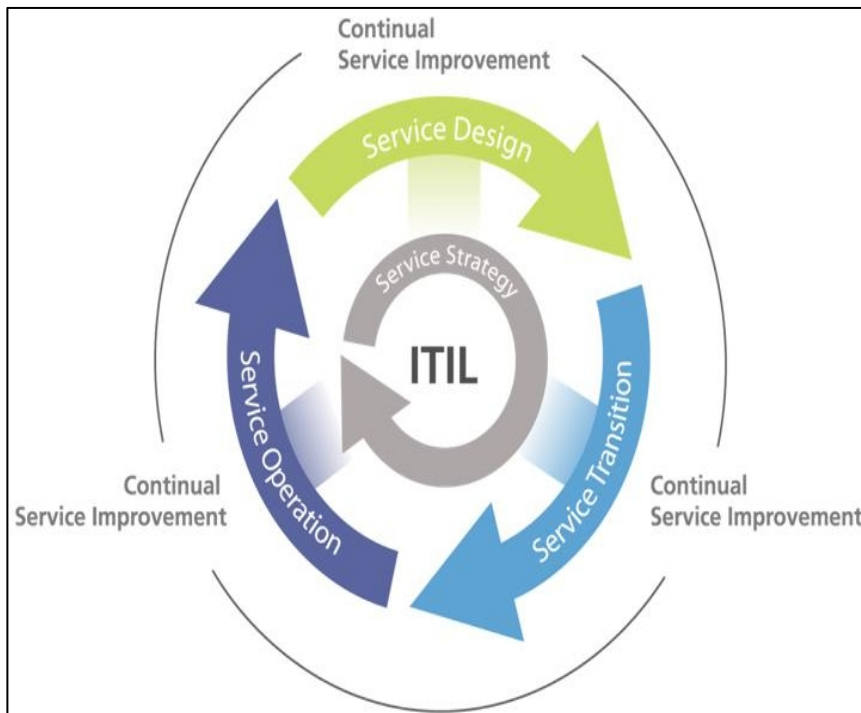


Figure 1 Phases of the ITIL framework (Van Bon et al., 2007)

The way the service should flow along the lifecycle starts at the core in the service strategy level, then it moves to the service design phase, then to service transition, then to service operation and finally to the continual service improvement and then back to the service strategy. (Van Bon et al., 2007).

Lets talk now about the main idea of each one of the phases:

*Service strategy*: As I mentioned before, this is the core of the service lifecycle. It includes an understanding of the business perspective, position, future plans and patterns that the service provider needs in order to deliver the service that meets the Service Level Requirements (SLRs).

*Service design:* The main goal in this phase is to cover the current and future SLR. This design includes architecture, processes, policies and documents (Van Bon et al., 2007).

*Service transition:* This phase concerns the delivery of new services into the live environment or changes in the existing services (Gallacher and Morris, 2012).

*Service operation:* The phase of achieving effectiveness and efficiency in providing and supporting services in order to ensure value for customer and the service provider. (Van Bon et al., 2007). Includes the day-to-day delivery of services.

*Continual service improvement:* The phase of creating and maintaining the value for the customer by design improvement, and service introduction and operation. (Van Bon et al., 2007).

If we take a closer look at the configuration of the phases, we will find out that each phase is conformed of smaller units called processes. At the same time, some of those processes are shared between phases. For example, the "capability management" process is shared between the service design and service operations phases. Table 2 shows this concept using a matrix where the columns represent the phases and the rows represent the processes:

| STAGE | SERVICE STRATEGY | SERVICE DESIGN | SERVICE TRANSITION | SERVICE OPERATION |
|---|---|---|---|---|
| PROSESS | | | | |
| FINANCIAL MANAGEMENT | X | | | X |
| KNOWLEDGE MANAGEMENT | | | X | X |
| SERVICE ASSET AND CONFIGURATION MANAGEMENT | | | X | X |
| CHANGE MANAGEMENT | | | X | X |

| | | | | |
|---|---|---|---|---|
| **RELEASE AND DEPLOYMENT** | | | X | X |
| **CAPACITY MANAGEMENT** | | X | | X |
| **AVAILABILITY MANAGEMENT** | | X | | X |
| **IT SERVICE CONTINUITY MANAGEMENT** | | X | | X |
| **INCIDENT MANAGEMENT** | | | | X |
| **PROBLEM MANAGEMENT** | | | | X |
| **EVENT MANAGEMENT** | | | | X |
| **ACCESS MANAGEMENT** | | | | X |
| **REQUEST FULFILMENT** | | | | X |

Table 2 Relation between stages and processes in ITIL (Gallacher and Morris, 2012)

Now we are going to describe the scope, objectives and purpose for the processes in the service design and service transition phases. The other processes are out of the scope of this master's thesis but those readers that are interested in the details of the processes can read through the references regarding the ITIL framework.

### 3.1.3. Service design processes:

*Capacity management:* This process is responsible for ensuring that the capacity of IT services and the IT infrastructure is able to meet current and future capacity and performance needs in a cost-effective and timely manner.

Capacity management must understand the likely changes in capacity requirements and ensure that the design and ongoing management of the service meet this demand (Gallacher and Morris, 2012).

*Capacity management:* ITIL states that capacity management is responsible for ensuring that the capacity of IT services and the IT infrastructure is able to meet agreed current and future capacity and performance needs in a cost-effective and timely manner.

The purpose of this process is to understand the current and future capacity needs of the service and to ensure that the service and its supporting services are able to deliver to this level (Gallacher and Morris, 2012).

The objectives of capacity management are met by developing plans in order to identify the current and future needs of the customers. Once the trends for future needs are identified, it is possible to develop the plans to fulfill them.

*Service continuity management:*  This process is responsible for risk management and risk identification in the IT services (Gallacher and Morris, 2012). It is in these processes where the customer agrees to lower boundaries acceptable for the service when a disaster occurs.

The main objective in this process is to reduce the chance of a disaster occurring at all by identifying the risks to IT services and implementing cost-effective countermeasures to reduce or remove the risk (Gallacher and Morris, 2012).

The scope of this process is not short interruptions of the services, or the risk associated with the changes in the business, it is service continuity management focused on the major events that have a catastrophic impact on the ability of the service provider to supply the vital services that enable the business to achieve its aims.

*Availability management:*

Lets start with the definition of availability: The ability of an IT service or another configuration item to perform its agreed function when required.

The purpose of the availability management process is to take the necessary steps to deliver the availability requirements defined in the SLA. The process should consider both the current requirements and the future needs of the business (Gallacher and Morris, 2012).

From the lifecycle point of view, the availability management processes encompass all the phases of the service lifecycle in the design phase, to ensure availability considerations from the start. Once the service is operational, it is possible to identify ways to reduce risk and improve availability, this is known as proactive availability management. In the design phase, availability management take into consideration any downtime and implements measures to reduce the frequency and length of any future events. (Gallacher and Morris, 2012)

The availability management processes include all the operational services and technology. The scope includes operational and new services where SLR or SLA are in agreement.

### 3.1.4.  Service transition processes:

The purpose of service transition is to ensure that the services that have been agreed upon and designed through the stages of strategy and design are now moved effectively into operation. The scope of service transition covers all aspects of introducing new services to the operational environment. It will have a close association with project management activity and may adopt a project management approach to the coordination of the activities (Gallacher and Morris, 2012).

The scope of the service transition phase covers all planning, building, testing, evaluating implementation and deployment of new services or existing ones. Guidelines for the migration of services from provider to provider and the retirement of services is also included.

*Change management process:* The purpose of this process is to control the lifecycle of all changes, enabling beneficial changes to be made with a minimum disruption to IT services. (Gallacher and Morris, 2012).

Based on the definition of change given at the beginning of this section, the scope of this process covers all the lifecycle stages. Part of the scope is to define those changes that are out of the scope; for example all those changes that are bigger than the service like change on the IT department structure or those that happen in the day to day operations like repairing a printer.

*Knowledge management processes:* Its purpose is to ensure that ideas, perspectives, experience, and information are shared and that this is delivered at the right time and to the right place to enable informed decision-making. (Gallacher and Morris, 2012).

The objectives in this process are:

Improve the quality of decision making, ensure that staff members have an understanding of the values and services, maintain a service knowledge management system, gather analyses and share and use the data and information through the service provider organization.

Even though the description of this process is located in the service transition stage, its scope covers all stages of the lifecycle.

Release and deployment processes: The purpose of this stage is to ensure that the building, testing, and deployment of the release is delivered with minimal negative impact on the business. Another key purpose is to ensure that the activities are planned, scheduled, and controlled according to the needs in the organization.

Objectives of these processes include: ensure quality and warranty are met by the new service or change, manage

issues produced by the release, ensure knowledge transfer to the stakeholders of the release, ensure that the training is provided for the support teams in operations to enable capacity for maintenance and support in accordance to the quality and warranty requirements.

The scope of this process covers all the processes, systems and functions that interact in delivering a release into the live environment. It includes as well, the handover of the release to the operation staff (Gallacher and Morris, 2012).

*Service asset and configuration management:* The purpose of this process is to ensure control over the assets used to make up the services. (Gallacher and Morris, 2012).

The objectives of this process include: ensure that the assets that are under the control of the IT department are properly manage, identify control and record the services and configuration items used to support the business, manage the configurations items that make up the services.

The scope of the service asset and configuration management proses is to identify the configuration items that will be managed as service assets and apply control to their management. (Gallacher and Morris, 2012).

### 3.1.5. Roles in the service lifecycle

Even though every stage has it own roles, there are a set of common roles along all the stages and processes in the service lifecycle. I am going to describe them in this section.

*Service owner:* According to ITIL each service should have a service owner, this clarifies who is accountable for the whole service and ensures that there is focus on the business process that the service supports (Gallacher and Morris, 2012).

These are the main responsibilities of the service owners:

- To ensure that the service is delivered and supported within the required standards.
- To communicate with the customer regarding issues with the delivery of services.
- To ensure the continuous service improvement by identifying possible improvements.
- To notify when one should prioritize a major incident affecting the service.

*Process owner:* The process owner is accountable for one singe process across multiple services. The process owner is accountable for ensuring the process is fit for its purpose and is carried out correctly by the process managers and practitioners.

The process owner is also accountable for:

- Processing the design including the metrics to measure the process performance.
- Ensuring the upgrades and availability of documentation to those who require it.
- Ensuring the availability of resources to carry out the process.

*Process manager:* The process manager is accountable for the success of the process but may often not be responsible for actually carrying it out. The responsibility for managing the day-to-day implementation of a process belongs to the process manager. (Gallacher and Morris, 2012)

The process manager is also responsible for:

- Ensuring the right number of staff is assigned to cover the roles of the process and ensuring that the staff understands what is expected from them.

- Monitoring the process metrics to confirm the process is working according to the purposes and objectives it was created for.

*Process practitioner:* Those who carry out all the activities, they are responsible for the following tasks:

- Completing process activities in according to the standards.
- Working with the process stakeholders to ensure the process inputs, outputs and interfaces work properly to deliver the desired outputs.
- Keeping track of the process activities by using the recording software platform or the tools agreed to in the standards.
- Delivering the process activities under the guidance of the process manager.

As a practitioner, the staff member will experience first-hand any issues with the process, such as tools that do not support the process effectively, bottlenecks in the process flow, or ambiguities in the documentation. The process manager and process owner should therefore seek out the views of practitioners when attempting to identify possible improvements. (Gallacher and Morris, 2012).

## 3.2.   RACI MATRIX

In large organizations it is a bit difficult to set boundaries and specify tasks to the roles that interact in the delivery and operation of services. One of the best practices adopted worldwide in the ICT industry is to map the roles and define the level of involvement in every task.

The RACI MATRIX is used to do this mapping and shows the roles and responsibilities for activities and processes. By using this matrix, the stakeholders get and easy-to-

understand visual reference including responsibilities and accountabilities (Gallacher and Morris, 2012).

The RACI matrix is not part of the ITIL framework, but it is quite normal that some writers use the RACI matrix to map out processes in the ITIL framework. I will define the RACI matrix as an independent topic in the theoretical foundings but I will use it to map out the roles and tasks for Network Management processes.

There are four major features when using the RACI matrix:

- When the process is applied to the entire process and not partially to some activities, the process owner is accountable for the process.
- When designing new processes, the RACI matrix is useful because it ensures that all aspects are taken into consideration.
- Clarifying roles and levels of involvement inside the process.
- Helping to clarify workflows and handoff point between those involved in the process.

Now I am going to talk about how this model works. As I said before, the matrix is a graphic tool used to map the process, so what we need, is to identify the tasks and the roles involved in the process. Once we have the map, we set in the intersection between arrow and column one of the following characters that from the acronym RACI:

*Responsible:* Those who are defined as responsible, "get the job done" by actually carrying out the task. There must always be at least one person responsible for each task (Gallacher and Morris, 2012).

*Accountable:* This single individual owns the task and ensures that the quality of the work carried out meets the required standard. The buck stops with them. To avoid any confusion, there can be only one person accountable for each task, and

each task must have an accountable person (Gallacher and Morris, 2012).

*Consulted:* where appropriate for the process, there may be people who are consulted for their opinion regarding a process activity. They provide information. This is not a mandatory role like Accountable and Responsible; there may or may not be a Consulted person for an activity (Gallacher and Morris, 2012).

*Informed:* These people are updated as to the progress of the activity. As with Consulted, this is not a mandatory role; it depends on the particular activity (Gallacher and Morris, 2012).

In the following chapter I will use this tool to map the process according to the process level (3) defined and what is happening in real life.

## 3.3. PMBOK

PMBOK: Guide to the Project Management Body of Knowledge (PMBOK ® Guide) is a recognized standard for the project management profession. A standard is a formal document that describes established norms, methods, processes, and practices. The knowledge contained in this standard evolved from the recognized good practices of project management practitioners who themselves contributed to the development of this standard. (PMBOK, 2008)

I will cover the following topics from the PMBOK framework: definition of projects, project phases, organizational structure, processes, knowledge management areas and the relationship between process and the project management areas.

My main objective in explaining these topics is to give the reader a theoretical background making it easier to understand in great detail the description of the project life cycle, the conclusions, findings and recommendations I will make.

Another objective is to discuss the theoretical basis in order to use it in the discussion part so that a comparison of the current practices against the internal procedures and day-to-day work can be made.

At the end of the section I will close with a summary of what was done.

### 3.3.1. PROJECT DEFINITION

In accordance with the PMI institute, a project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. (PMBOK, 2008).

It is very important use this definition because it reminds us that this master's thesis aims to describe the project lifecycle for a service not a product. This product starts with the operation phase in accordance to the ITIL framework (described in this chapter).

With this idea in mind I will continue explaining the relationship between project life cycle and product lifecycle. Product life cycle consists of generally sequential, non-overlapping product phases determined by the manufacturing and control need of the organization (PMBOK, 2008). On some occasions processes take place in one of more phases of the product life cycle. An example of this behavior is the product I choose in this thesis because the delivery of Network Management is carried out like a project.

The difference between projects and operations is that projects are temporary endeavors, while operations are permanent endeavors that produce repetitive outputs with resources that will perform the same task according to the company's product life cycle (PMBOK, 2008). The operations work is aimed to support the organization's strategic plans.

After these clarifications let's continue with projects. Projects are divided into phases, a project phase is a division within the project where additional control is needed to effectively manage the completion of a major deliverable (PMBOK,

2008). The number, size and sequence of the phases depends on the nature and complexity of the project.

The phases of the project should have deliverables to determine whether the phase has been completed and if the outputs meet the acceptance parameters. The deliverables at the closing out of the project receive special care regarding the exhaustive performance tests and simulations, because once the project finishes the service starts operating.

Even though the PMI does not define a maximum number of phases, all projects can be mapped in the following lifecycle structure:

- Project starts
- Organization and preparing
- Carrying out the project work
- Closing the project

With this structure in mind, the PMI developed three trend lines: first for cost and staffing level versus time; and second, stakeholder's influences, risk and uncertainty; and third, the cost of changes.

The next two figures extracted from the PMBOK guide explain these trends:
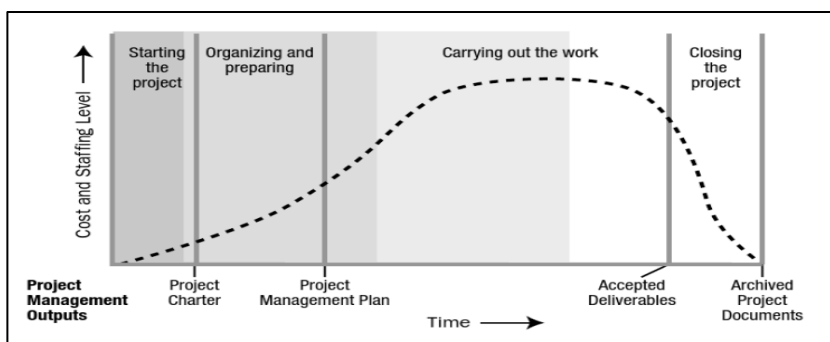


Figure 2 Cost and staffing level in typical project (PMBOK, 2008)

Cost and staffing levels are low at the start, peak as the work is carried out, and drop rapidly as the project draws to a close. The dashed line in Figure 2 illustrates this typical pattern.
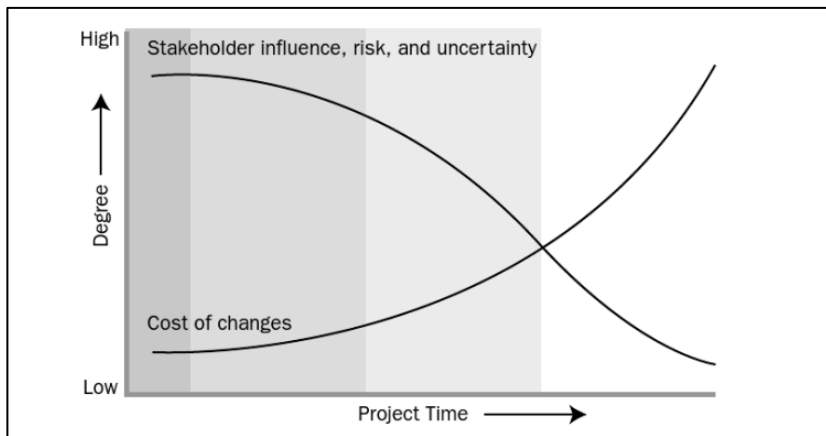
**Figure 3 Impact of variable based on project time (PMBOK, 2008)**

As illustrated in Figure 3, Stakeholder influences, risk, and uncertainty, are greatest at the start of the project. These factors decrease over the life of the project.

Ability to influence the final characteristics of the project's product, without significantly impacting cost, is highest at the start of the project and decreases as the project progresses towards completion. Figure 3 illustrates the idea that the cost of changes and correcting errors typically increases substantially as the project approaches completion.

### 3.3.2.  Phase relationship between projects:

According to the way the phases are interconnected with each other, the PMBOK defined the followings phase-to-phase relationships:

*Iterative relationships:* This is when the planning is done after the competition of each phase. These styles of relationships are used in projects where the environment changes quickly; so long term planning is not worthwhile. The disadvantage of this style of relationship is that all the design and planning staff must be available at the beginning of every new phase.

*Sequential relationship:* This happens when a new phase cannot start before the completion of a previous phase. In this phase-to-phase relationship the uncertainty decreases, but the duration of time that the project takes increases.

Sequential projects, the beginning of a phase is a checkpoint to review previous assumptions, review risks and define in more detail the processes to complete the deliverables at the end of the phase.

*Overlapping relationship:* The next phase can starts before the previous one is completed (PMBOK, 2008). The duration of time the project takes decreases, but the risk increases and there is the possibility of reworking.

Independently of the number and size of phases, all of them have these characteristics:

In sequential phases, there should be some kind of deliverable to hand off between them. The end of the phase represents a control and decision point to reassess the track of the project. The scope of every phase is different from the others phases of the same project.

### 3.3.3. Processes

Phases of the PMBOK framework are made out of processes as it happens in ITIL. In projects there are two main process categories (PMBOK, 2008):

*Project management processes:* Ensure the effective flow of the project throughout its existence.

*Product-oriented processes:* Specify and create the project's product. Product-oriented processes are typically defined by the project life cycle.

The product-oriented processes focuses on the final product, so they are not included in the scope of this master's thesis. On the other hand, I am going to explain the project management processes.

Project management processes are grouped into five categories known as project management processes groups. Those processes groups are common for all projects:

*Initiating processes group:* Processes performed to define a new project or a new phase of an existing project by getting the authorization to start the new process or phase. This processes group also includes the stakeholders' identification. According to the PMBOK: involving customers and stakeholders during the initiating processes improves the probability of shared ownership, deliverables acceptance and customer and stakeholders satisfaction (PMBOK, 2008)

*Planning process group:* processes required to define the scope of the project. Develop the project management plan and the project documents to carry out the project (PMBOK, 2008). Because of the changing environment along the project life cycle, it is necessary to execute planning processes over and over again every time the magnitude of a change in the environment requires it.

Planning processes groups include: collect requirements from stakeholders, scope definition, WBS, define activities, sequence activities, estimate activities resources, estimate activity durations, develop schedule, cost and budget estimation, quality management, human resource plan, and plan communications.

*Executing processes group:* those processes defined to complete the work in the project management plan to meet the project specifications (PMBOK, 2008).

This group includes processes like: direct and manage project execution, perform quality assurance, acquire project team, develop project team, manage project team, distribute

information manage stakeholder expectations and conduct procurements.

Monitoring and controlling process group: Those processes aimed to track, review and regulate the progress and performance of the project (PMBOK, 2008). The processes in this group also are used to identify deviations from the planning and initiate the correctives actions. These processes should be present along the whole lifecycle.

Processes in this group include: monitor and control project work, perform integrated change control, verify scope, control scope, control schedule, cost control, perform quality control, report performance, monitor and control risks and administer procurements (PMBOK, 2008)

*Closing processes groups:* Processes associated to the closure of all the activities    across all the project management processes in order to formally complete the phase or project.

Processes in this group include: close project or phase, and close procurements.

At this point, it is very important to remember that the processes groups are not project phases or project stages, because a stage in one project can include several processes groups. For instance, the design phase could include executing, monitoring and closing processes.

The processes groups are not isolated. Instead of that, they interact with each other. The figure 4 shows how this interaction works:
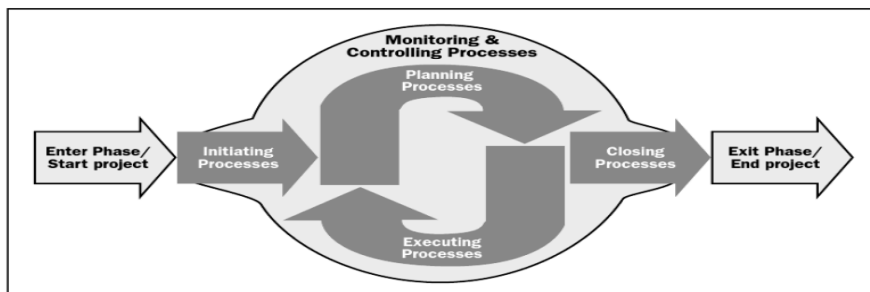


Figure 4 Project management processes groups (PMBOK, 2008)

Project management processes groups.

As we can see in figure 4, the processes groups are linked together. They interact with each other in the sense that the deliverables of one process group is the input of another one.

After the project starts, all the authorizations and relevant information for the project are collected with the initiating processes. Using the output from the initiating processes, the planning team elaborates the plan for the project.

Once there is a plan, the executing team performs the executing processes and provides continuous feedback to the planning team to evaluate the deviations and perform changes to the plan or make the required modifications. Once the plan is completed, the project team performs the closing processes to deliver the project outputs according to the customer's requirements.

It is really important to remember that all these processes run in parallel with the monitor and control processes, these processes ensure that the issues that emerge from the normal flow of the project are reported in time and appropriate actions take place to keep the project on track.

### 3.3.4. PROJECT MANAGEMENT KNOWLEDGE AREAS

The PMBOK defines nine different areas needed for the project execution. At the end of this section I will explain the way that the knowledge areas interact with the project management process group.

*Project integration management*: Includes the processes and activities to identify, define, combine, unify and coordinate the various processes and project management activities within the project management processes groups (PMBOK, 2008). This knowledge area has implications on decision making

about resource allocation, making trade-offs among competing objectives and alternatives and managing the interdependences among the project management knowledge areas.

*Project scope management*: Includes the processes to ensure the achievement of nothing more than the work required in order to complete the project successfully (PMBOK, 2008).

There is an important difference between the project scope and the product scope:

*Project time management:* Includes the processes required to finish the project within time (PMBOK, 2008).

*Project cost management:* Includes the processes for calculating and estimating the budget and controlling cost so the project can be finished within the approved budget (PMBOK, 2008). The processes are the following: estimate costs, determine budget, and control cost. For small projects cost estimation and determining the budget are considered to be part of the same processes.

*Project quality management*: Project Quality Management includes the processes and activities of the performing organization that determines quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken (PMBOK, 2008).

Project Quality Management addresses the management of the project and the product of the project. It applies to all projects, regardless of the nature of their product. Product quality measures and techniques are unique for the type of product produced by the project.

*Project human resource management* Includes processes to organize, manage and lead the project team. All the people that have roles and responsibilities to complete the project compose the project team (PMBOK, 2008). Depending on the nature of the project, most of the people should be involved in

the execution phase or they can do that in another project, most of the people are focused on planning.

For smaller projects, the project management responsibilities can be shared by the entire team or administered solely by the project manager.

P*roject communications management*: Includes the processes associated to ensure timely and appropriate generation, collection, distribution, storage, retrieval and disposition of project information (PMBOK, 2008).

P*roject risk management*: Processes of conducting risk management planning, identification, analysis, response planning and monitoring and control on a project (PMBOK, 2008). The objectives of project risk management are to increase the probability of positive events and decrease the probability and impact of negative events in the projects.

P*roject procurement management:* Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team (PMBOK, 2008). The organization can be either the buyer or seller of the products, services, or results of a project.

Project Procurement Management includes the contract management and change control processes required to develop and administer contracts or purchase orders issued by authorized project team members.

Project Procurement Management also includes administering any contract issued by an outside organization (the buyer) that is acquiring the project from the performing organization (the seller), and administering contractual obligations placed on the project team by the contract.

I will close out this section with table 3 that maps the relationship between the project management process groups and the project management knowledge areas.

| | PROJECT MANAGEMENT PROCESS GROUPS | | | | |
|---|---|---|---|---|---|
| Knowledge areas | Initiating process group | Planning process group | Executing process group | Monitoring and controlling process group | Closing process group |
| Project integration management | Develop project charter | Develop project management plan | Direct and manage project execution | Monitor and control project work. Perform integrated change control | Close project or phase |
| Project scope management | | Collect requirements. Define scope. Create WBS. | | Verify Scope Control Scope | |
| Project time management | | Define activities Sequence activities Estimate activity resources Estimate activity durations Develop schedule | | Control schedule | |
| Project cost management | | Estimate cost Determine budget | | Control Costs | |
| Project quality management | | Plan Quality | Perform Quality Assurance | Perform Quality Control | |

| | | | | | |
|---|---|---|---|---|---|
| Project human resource management | | Develop Human Resource plan | Acquire project team Develop project team Manage project team | | |
| Project communications Management | Identify Stakeholders | Plan Communications | Distribute information. Manage stake holders Expectations | Report performance | |
| Project risk management | | Plan risk management. Identify risks. Perform a qualitative risk analysis. Plan risk responses | | Monitor and control risks | |
| Project procurement management | | Plan procurements | Conduct procurements | Administration | |

Table 3 Project management process groups and knowledge areas mapping (PMBOK, 2008)

## 3.4. ORGANIZATIONAL STRUCTURE

The organizational structure in a company defines how the resources are allocated across the different departments in the company. There are four major types of organizational structures: functional organization, weak matrix, balance matrix and strong matrix. I will describe them in the following pages.

### 3.4.1. Functional organization

In this organization (Figure 5) each employee has one clear superior and departments group the staff members separately. Each department in the organization will do its project work independent of other departments.
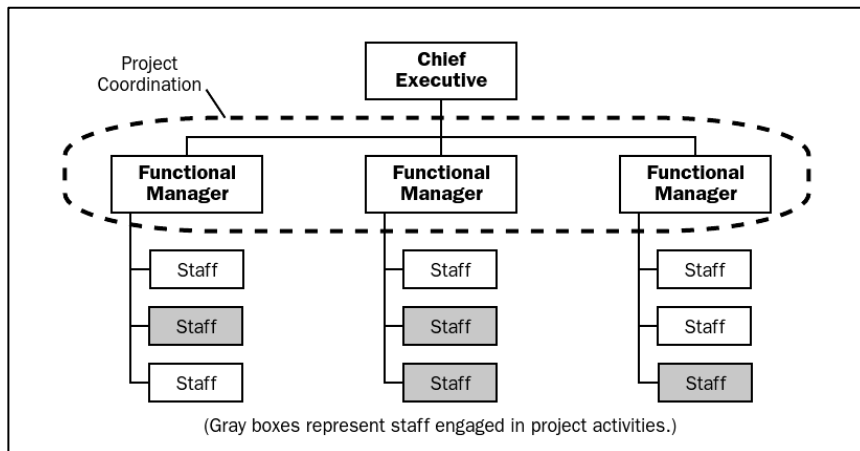


Figure 5 Functional organization schemes (PMBOK, 2008)

The main objectives of this organization scheme are (Hobbs H, 1993):

Facilitate supervision by aggrupation of similar activities in the same unit.
Group activities and resources to improve economies of scale.
Facilitate the development of technical competency in the vital areas for the core business of the company.

I will use the table 4 chart to summarize advantages and disadvantages in this organization scheme:

| ADVANTAGES | DISADVANTAGES |
|---|---|
| Development and maintenance of technical competences | Narrow perception: there is not and overall perspective |
| Synergy among specialists | Difficulty integrating specialists from different areas |
| | Difficulty creating motivation for the project |
| | Lack of openness to the environment |
| | Risk of neglecting aspects not related to the specialty |

Table 4 Advantages and disadvantages of the functional organization (Hobbs H, 1993)

From table 4 it is possible to conclude that the specialization is one of the main characteristics of this structure. Specialization enhances the capacity of the development of technical competences but at the same time it narrows down the perspective when dealing with external factors outside of the specialization field.

### 3.4.2. Project based organization

Most of the company resources are involved in project work. The project manager has great autonomy and authority, this reduces ambiguity and permits better coordination.

The department in this organization provides support services to more than one project at the same time. Even though the company aims to work on a project structure, there are departments like accountability, legal and human resources that remain in a functional organization base (Hobbs H, 1993).

In some cases when the company runs a large project, they use this kind of structure because it more or less places the project in an independent structure apart from the organization.

This scheme is suitable for projects that require systems integration, trade-offs among cost, schedule and quality and clear communication channels with outside stakeholders (Hobbs H, 1993).

The advantages and disadvantages of this scheme are summarized in table 5.

| ADVANTAGES | DISADVANTAGES |
|---|---|
| Clear identification of overall project responsibility | Duplication of efforts and resources |
| Good systems integration | Limited development and accumulation of know-how |
| More direct contact among different disciplines | Employment instability |
| Clear communication channels with stakeholders | |
| Clear priorities | |
| Effective trade-offs among cost, schedule and quality | May tend to sacrifice technical quality for the more visible variables of schedule and cost |
| Client-oriented | |
| Results-oriented | |

Table 5 Project based organization advantages and disadvantages. (Hobbs H, 1993)

### 3.4.3. Matrix organizations

They are a combination of functional organization and project-based organizations, the matrix organizational structure wants to take advantage of the features of the fully project-based structure and the organizational structure while avoiding their disadvantages.

The components from projects and the organization schemes remain administratively independent, but at the same time interdependent in the execution of projects.

The specialists continue under the same authority of the head of the department but they are "lent" to projects as long as they require it. The functional components become centralized reservoirs of specialized resources (Hobbs H, 1993).

The projects components are comprised of project managers directing multidisciplinary teams whose composition may frequently vary as the project progresses through the different phases of the lifecycle(Hobbs H, 1993).

According to the degree of or similarity to the matrix with the project based approach or the functional approach, the PMBOK divides matrices in three categories (PMBOK, 2008):

*Weak matrices* have more to do with the functional organization and the project manager has a coordinator role.

The weak matrices take staff from the departments that the projects require, and one of these staff members has a supervisor role (Figure 6).
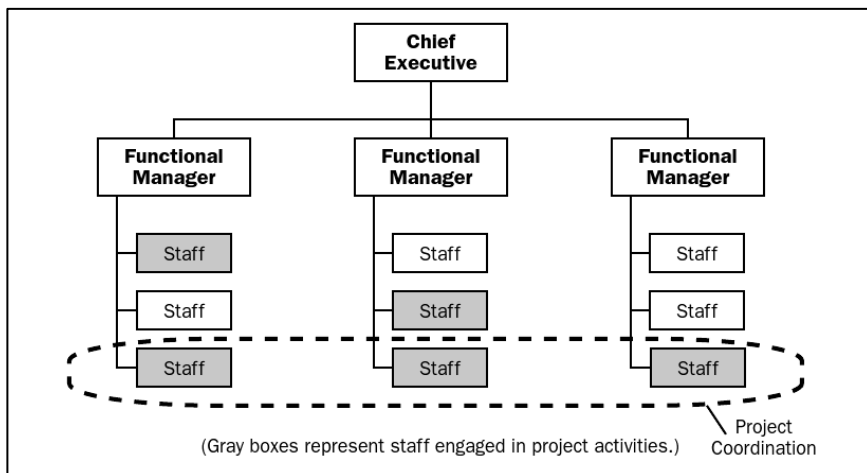


**Figure 6 Weak matrix organization (PMBOK, 2008)**

On the other hand, *strong matrices* have characteristics of the project-based organization; the project manager has full

authority over full-project administrative staff. Figure 7 shows this structure. It is important to notice that there is a "department" for project management
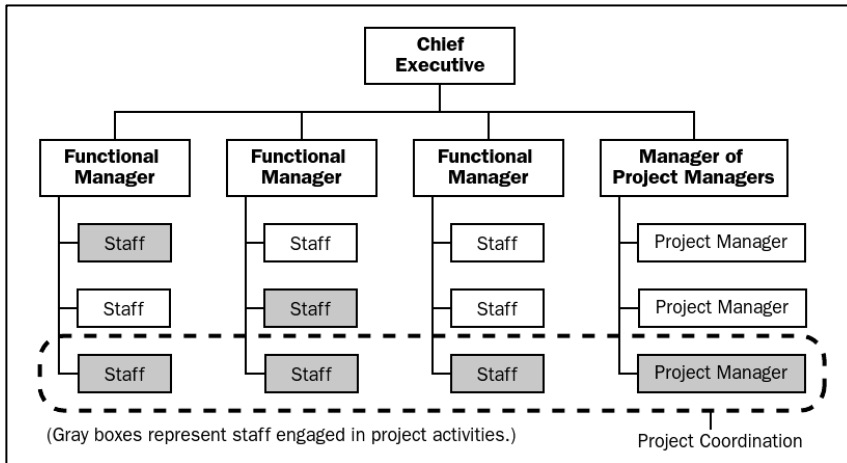


**Figure 7 Strong matrix organization, (PMBOK, 2008)**

The *balance matrix organization* (Figure 8) recognizes the need for a project manager but they are not provided with full authority over the project and project funding. The budget decisions are done in agreement with the functional chief of the department.
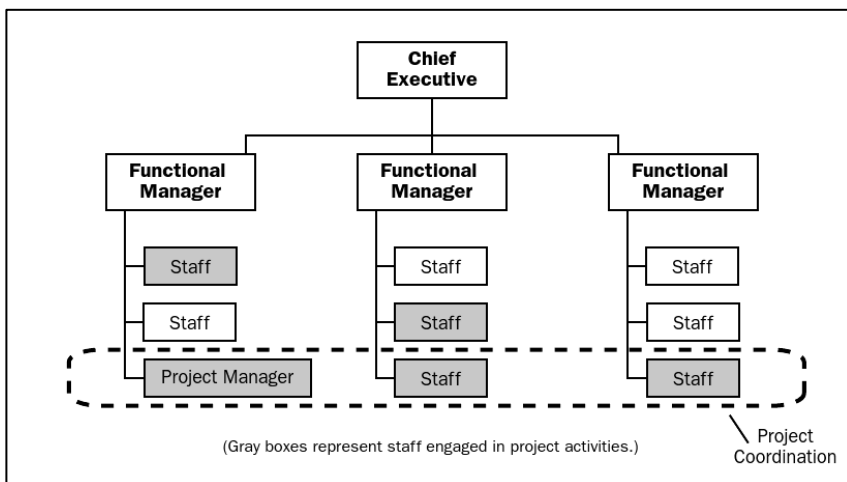


**Figure 8 Balanced matrix organization (PMBOK, 2008)**

Table 6 summarizes and maps the organizational structure and the project characteristics.

| Organizational structure / Project characteristics | Functional | Weak matrix | Balanced matrix | Strong matrix | Project based |
|---|---|---|---|---|---|
| Project management's authority | Little or none | Limited | Low to moderate | Moderate to high | High to almost total |
| Resource availability | Little or none | Limited | Low to moderate | Moderate to high | High to almost total |
| Who controls the project budget? | Functional manager | Functional manager | Mixed | Project manager | Project manager |
| The Project manager's role | Part-time | Part-time | Full-time | Full-time | Full-time |
| Project management administrative staff | Part-time | Part-time | Part-time | Full-time | Full-time |

Table 6 Organizational influence on projects (Hobbs H, 1993)

## 3.5. SUMMARY

In this section I presented the theoretical background about ITIL. I described the four phases of the framework and the interrelationship between the four of them. I explained how processes form the phases and explained in detail those processes that are relevant to the project life cycle of the Network Management service.

I also presented the roles that are common across the four phases and one tool called the RACI MATRIX, which is broadly used to map processes based on roles and activities.

In this section I defined keywords to develop an understanding of the project lifecycle. I explained a broad approach to the project lifecycle, relationships between projects and operations, product lifecycle and projects.

I mentioned and went through the different types of organizational structures, project management processes groups and project management areas of knowledge and mapped the relationships between project management processes groups and project management areas of knowledge.

# 4. FINDINGS

This section is divided into four parts:

In section 4.1 I will start with the description of level (3) and the services they offer in their service portfolio. After that, I will continue with the description of the Network Management service.

It is important to remember that the case study in this thesis is the project life cycle for the delivery or installation of a telecommunications service called Network Management.

In section 4.2 I will present a detailed description of the project lifecycle according to the internal processes of the company, tasks and roles. At the end of the section, I map out these tasks and roles in a RACI matrix. The aim of this section is to describe the different processes and phases of the delivery of a project in the Network Management service area according to research question three.

In section 4.3 I will list the issues that affect the project life cycle and briefly explain the extent of the issue. After this brief explanation, I will map out the issues in two different ways: first, I will map them out according to the stakeholder and second, I will map out the findings according to the affected phases in the project lifecycle.

Based on the output of the two charts mentioned in the previous paragraph, I will rank the findings according to their impact in reducing the time spent in the project lifecycle and I will use the three most relevant findings in the discussion chapter to identify which processes have the highest potential for and the greatest effect on reducing the life cycle.

## 4.1. Description of the company:

Level (3) is an international telecommunications company with 11,000 employees. The headquarters are located in Bromfield, Colorado. Level (3) is one of the six Tier 1 providers in the world and it is divided into six continental clusters: North America, Europe, Middle East, Africa, Asia Pacific and South America. America's level (3) offers services in: Argentina, Brazil, Chile, Colombia, Ecuador, Panama, Peru, Mexico, Venezuela, The United States (Florida) and the Caribbean region.

### 4.1.1. Description of the services:

Level (3) offers telecommunications services like data, voice, video security, managed and professional services and cloud and IT services.

In South America, most of the famous products among the level (3) customers are contained in the managed and professional services portfolio. In this portfolio, customers find products aimed at increasing the performance and efficiency of their networks.

These services cover: managed routers, application performance management, managed WAN optimization, smart demarcation for Ethernet VPN, managed Ethernet access, managed dedicated fiber, managed voice, and professional services.

WAN optimization, application performance management and professional services are the services in the Network Management service portfolio offered in Colombia. Now I will describe these services.

Professional services are services that help customers in planning, deploying, and optimizing and managing network infrastructure. This service includes program and project management, network architecture, engineering services and network migration and implementation services.

Professional services in Colombia are offered on a customer demand basis.

Managed WAN optimization: This service can increase key business application efficiency and improve bandwidth consumption while eliminating the need for highly specialized in-house experts. WAN optimization includes procurement, installation, configuration, monitoring and management.

Application performance management: Contains the tools that network managers require to optimize network and application efficiency. Application performance management increases network visibility and application performance data to speed troubleshooting and resolution. It provides the network managers with a set of tools to complete a thorough analysis with more information made available for decision-making regarding bandwidth utilization and application efficiency.

### 4.1.2. Network Management

Network Management is a service oriented towards the proactive monitoring, operation, administration, reporting and SLA measurement for WAN and LAN based on high skilled human resources and robust network monitoring platforms. The main features of the Network Management service are:

*Proactive monitoring:* Consists of the identification of events in communication channels in the customer network, this identification is done by a 7*24 service desk provided with skilled engineers with monitoring platforms that enables them to start the trouble shooting process as early as possible. In Network Management services it does not matter if level

(3) is the service provider (the company that provides the communications channels) or if the customer hires a different one. As soon as the customer's service provider allows the configuration, their hardware will be monitored by level (3).

*Trouble tickets' tracking:* Network Management includes the opening, tracking, updating and closing of the trouble tickets opened by the customer.

*Change request management:* Network Management is responsible for opening, tracking, updating and closing the change request tickets that the customer opens.

Planning, control and execution of the networking backup test, DRP (Disaster Recovery Plan) or any other redundancy or backup infrastructure.

*Capacity management:* Because of the reports that Network Management brings to the customers, it is possible to determine trends about bandwidth utilization, CPEs' CPU utilization and take early actions concerning bandwidth or hardware upgrades.

Reports: As part of the service, Network Management offers their customers the measurement of KPI for their communication network. KPI is previously defined and bundled into four different categories:

- Category1: Availability and capacity.
- Category2: Network Management performance.
- Category3: Network Management application visibility.
- Category4: Network Management WAN optimization.

Every category measures different KPI according to the customers' needs. The measurement is done by using protocol analyzing tools based on SNMP like NETVIEW, NETRAC and so on.

*SLA measurement:* Network Management performs the SLA measurement by collecting information about the incident from the CRM, and comparing it with the threshold indicated in the SLA. By doing this, Network Management offers solid tools that help clients identify if the service provided meets the SLA or not.

The output of this service is displayed in reports that contain details about historic and current information about the SLA. In order to guarantee the accurate measurement of the SLA in level (3) channels, all the tickets must be closed after the customer and level (3) agree on topics like time unavailability and who is responsible.

The advantages that the customer experiences because of using Network Management services are:

- Reduction in the Network Management cost: When the customer acquires Network Management, a high qualified staff person takes care of the network, reducing the customers' cost that is associated with hiring IT staff.

- Quality and reliability: the set of tools and resources that Network Management uses in the processes give customers solid information about the performance of the network as well as accurate measurements which can be used to determinate whether or not the SLA accomplishes what the customer purchased.

- Technological risk mitigation: By delegating the management of the network to level (3) - a company with expertise, know-how, solidity and resources - the customer reduces the technological limitations associated with non-professional Network Management carried out by internal staff.

- Resource optimization according to the core business: When the customer acquires Network Management

services, the work and operative load for IT staff decreases. In consequence, it is possible to reallocate resources according to the customers' core business. In other words, it does not make sense that a construction company becomes an expert in Network Management. The company should focus its resources in its core competence area being construction, and leave the Network Management to level (3) whose core competence is in Network Management.

## 4.2.    Description of the Network Management project life cycle

I will divide the description of project lifecycle in two sections. In the first section, I will define and go into some details about the stakeholders that interact along the duration of the project life cycle of the Network Management service. Then in the section two, I will continue with the description of the activities and stages of the Network Management project life cycle.

### 4.2.1.  Stakeholders

This section includes a description of the internal stakeholders that participate in the tasks and processes associated with the Network Management installation project.

*Account Manager (AM):*
Is responsible for the selling activities, the AM is accountable for:

- Offering the products and services to the customer.
- Bringing in new customers to level (3).
- Agreeing with the customer on prices, discounts and so on.

*Technical account manager (TAM):*
Is responsible and accountable for the new customers' engineering design. The TAM is also responsible for the designs of the new requirements for products and services.

*Data product specialist (DPE):*
Is the person who knows all the details about the products level (3) offers. This includes: the SLA the company approves for the customer, the technical requirements and prices.

*Operations manager (OM):*
Is the person responsible for both the Network Management service and the Network Management Department. They are accountable for the service and the assignation of a balanced workload of subordinates. According to ITIL the OM is the owner of the service.

*Outsourcing coordinator (OC):*
Is a middle manager position, the OC is accountable for the supervision of those big customers that have level (3) staff members in the customers' facilities running projects that do not fit into the standard products and services category at the company. In Network Management services, the OC is accountable for the balanced distribution of new customers to the OE; they work with the OM on this task.

*Customer service manager (CSM):*
After the AM brings the new customer to the company, the CSM is accountable for the new sales and requirements that the customer requires. In other words, all new services the existing customer requires will be sold by the CSM.

*Service manager (SM):*
Is the person that will have contact with the customer regarding service topics and requirements. SM is accountable for:

- Taking care of the customer relationship.
- Presenting reports to the customer.
- Acting as a reference for questions and complaints.
- Identifying gaps in services and deploying plans to achieve continual service improvement.

*Operations Engineer (OE):*
Is the technician responsible for the customer, in comparison to the SM, the OE does not have contact with the customer. The OE's role is purely technical and it focuses on the following tasks:

- Tracking of SLA and KPI
- The elaboration of data analysis and reports
- Tracking preventive maintenance and performing BACKUP tests

*Management Engineer (ME):*
The core of the Network Management service is monitoring. The management engineer is accountable for the maintenance and configuration of the monitoring tools, as well as the processes improvement. MEs' functions are:

- Configuration, maintenance and availability control for all the monitoring tools
- Processes improvement
- Best practices application

*Monitoring engineer (MOE):* The monitoring engineer is the person who carries out the day-to-day activities in the operations phase of the service (once the project finishes the operational phase starts). MOE is accountable for:

- Bringing technical support to the customers at the 7*24 service desk
- Proactively monitoring the customers' nodes
- Starting the incident and problem management processes
- Bringing continuous feedback to the customer

Table 7 contains a summary of the stakeholders.

| STAKEHOLDER | ABBREVIATION | ROLE | DEPARTMENT |
|---|---|---|---|
| ACCOUNT MANAGER | AM | TO SELL PRODUCTS TO NEW CUSTOMERS | SALES & SERVICES |
| TECHNICAL ACCOUNT MANAGER | TAM | ENGINEERING DESIGNER | |
| DATA PRODUCT SPECIALIST | DPE | PRE-SALES ENGINEERING DESIGN INCLUDING SETTING PRICES | |
| OPERATIONS MANAGER | OM | NETWORK MANAGEMENT'S SERVICE OWNER | NETWORK MANAGEMENT |
| OUTSOURCING COORDINATOR | OC | PROCESS MANAGER | NETWORK MANAGEMENT |
| CUSTOMER SERVICE MANAGER | CSM | TO SELL NEW SERVICES TO EXISTENCE CUSTOMERS | SALES & SERVVICES |
| SERVICE MANAGER | SM | TAKES CARE OF THE SLA. | NETWORK MANAGEMENT |
| OPERATIONS ENGINEER | OE | TECHNICIAN RESPONSIBLE FOR THE CUSTOMER | NETWORK MANAGEMENT |
| MANAGEMENT ENGINEER | ME | MANAGEMENT AND MAINTENANCE OF MONITORING TOOLS | NETWORK MANAGEMENT |
| MONITORING ENGINEER | MOE | OPERATION PROCESS PRACTITIONER | NETWORK MANAGEMENT |

Table 7 Stakeholders summary (Florian, 2013)

## 4.3. Project lifecycle description

Now that I have defined the roles of the stakeholders in the project life cycle, I will go on to describe the project life cycle. It is important to mention that this description is based on internal procedures, not what happens in real life.

Based on the general description of the life cycle structure described in the PMBOK, I mapped out the tasks as is shown in s:
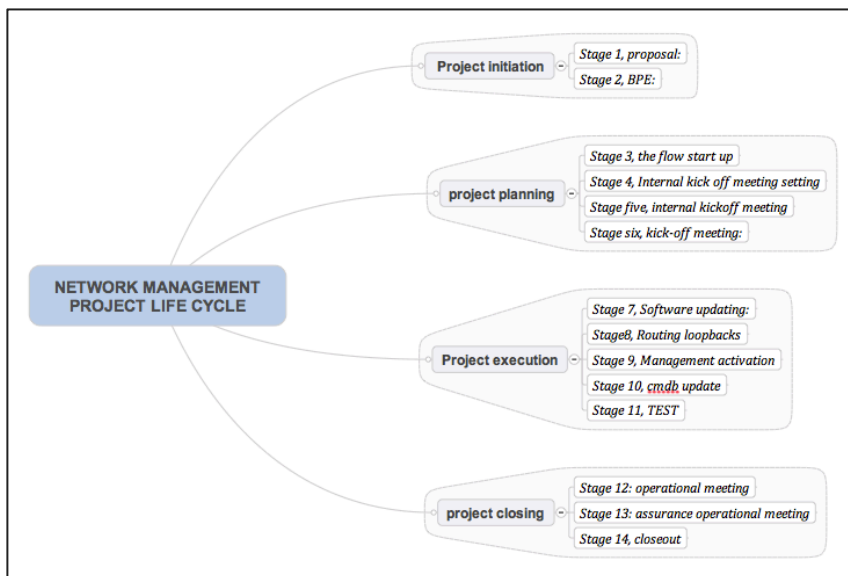


**Figure 9 Map of the project phases according to the general project PMBOK structure. (Florian, 2013)**

### 4.3.1. Project initiation group:

This group contains tasks related to the initiation of the processes that depend on the approval of the RFP by the customer.

*Stage 1, proposal:* In this stage the AM receives the RFP from the customer. The AM together with the DPE creates an economical proposal in order to fulfill the customer

requirements and answer the RFP. It is important to remember that this step will fulfill the customer expectations as long as they fit into the products, services and utility margins.

STAKEHOLDERS: AM and DPE.

*Stage 2, BPE:* If the customer approves the proposal, the AM informs the CSM about the new service and the CSM starts a workflow in the CRM SIEBEL. This workflow is known as Business Process Efficiency (BPE). The BPE starts two new workflows: an administrative one, regarding billing activities and a technical one, regarding a request for the installation of the service.

Once the technical workflow starts, the OM gets a notification by e-mail about it and chooses a SM for this new customer. This choice must be in accordance with the current workload for the SMs. As the OM is accountable for the Network Management Department, OM checks over revenue and cost estimations.

The OM delegates the responsibility to choose an OE for the new client to the OC. This choice is made according to the current workload of the OEs.

In parallel, TAM starts a dko to create the loopback interfaces in the CPE and route them to BBIP. The loopback interfaces might already exist, and in this case the dko is only accountable for the routing task.

STAKEHOLDERS: CSM, OM, TAM and OC.

### 4.3.2. Project planning group:
This group includes tasks to gather technical information about the client, the stakeholder's identification and participation in meetings, which express customer expectations and contractual details.

*Stage 3, flow start up:* The SM creates a dko and starts the workflow for the Network Management installation. In parallel the SM and the OE perform the following tasks:

OE
Checks over the existing engineering design in the CRM Dokuviz.
Understands the network topology for the new client; this task needs the participation of the TAM.
Does the inventory for the CPE (Customer Premise Equipment), branch offices, and communication channels that will be included in the Network Management service.
Calculates the media of the trouble tickets based on historical records, this only applies to old customers at level (3) that purchase Network Management. This information will be an internal reference used to compare the same parameter after Network Management implementation.
Fills in the previous information in a excel format called "P8CHECKLIST" and uploads it on Dokuviz.

SM
Checks over the documentation about the SLA purchased by the customer. This documentation is included in the contract.
Ensures that every branch office at Dokuviz is included in the service and ensures that every branch has the managed service element with the associated value.
Requests that the IT department includes oneself (the SM) in the e-mail distribution list to receive ticket notifications.

STAKEHOLDERS: SM, OE and TAM.

*Stage 4, Internal kick-off meeting setting:* The SM creates the presentation with the following info:
The SLA purchased by the customer for the Network Management service.
The network topology discussion.
Strategic information about the client. This includes the main branches according the customers' core business, relevant dates to monitor such as payments days, or channels that

require additional monitoring due to some KPI that cannot fluctuate much and so on.

STAKEHOLDERS: SM.
ESTIMATED TIME: 1 DAY.

*Stage five, internal kickoff meeting:* the AM, CSM and DPS share customer expectations with the rest of the team in an attempt to:

Align expectations and rules according to the contract
Share information about the client according to the contract
Develop work plans according to the contract
Share the information collected by the OE in the P8CHECKLIST
Have firsthand feedback from each other about possible questions or any additional relevant information that is not written in the contract.
Share a common view and common information about the services purchased by the customer.

STAKEHOLDERS: AM, CSM, DPE, OE, DPS and SME
STIMATED TIME: TREE DAYS.

*Stage six, kick-off meeting:* This is almost the same as the internal kickoff meeting but it includes the customer. The following information is achieved:

- A contact matrix for every branch office, provided by the customer
- A checklist to trouble-shoot channels provided by another carrier other than level 3.
- A request for SLA and MTTR for the other carriers.

The SM hands in the hierarchical structure of level (3) to the customer. This acts as a reference guide showing whom the customer should talk to in case complaints are not answered in the proper way.

Agreements about the reports are checked again and submitted to the customer, including its periodicity, the KPI to measure and so on.

STAKEHOLDERS: AM, CSM, DPE, OE, DPS, SME and customer
ESTIMATED TIME: FIVE DAYS.


### 4.3.3. Project execution group:
Contains tasks related to carrying out the work to configure and deliver the service.

*Stage 7, Software updating:* In this stage, the OE updates the configuration management databases at level (3). This stage includes the following tasks:

The OE manually updates the contact matrix in the customer's main view in Dokuviz.
The OE updates the layout of the customer's main view in Dokuviz according to the Network Management standard. This standard consists of sets of features and codes that help the OE easily understand the network topology and the monitored services in the CMDB.
The OE uploads every CPE configuration at every branch office, including the corresponding location in Dokuviz.

STAKEHOLDERS: OE
ESTIMATED TIME: 5 TO 10 DAYS

*Stage 8, Routing loopbacks:* In this stage, the OE does the entire routing configuration for the new customer.

The OE should check all the loopback interfaces according to the TAM specifications.
The OE routes the loopback address from the CPE at every branch to the NETRAC server.
The OE requests the netflow parameters from the engineering and product department. According to the service that the customer purchases, some configuration has to be done for the netflow platform (to receive this, the customer must apply

for the highest level of service categories which includes 3 & 4).

STAKEHOLDERS: OE
ESTIMATED TIME: 3 DAYS

*Stage 9, Management activation:* In this stage, the OE completes the monitoring software configuration for the new customer.

Copies the snm key (an internal parameter of the document management tool) to Dokuviz in Argentina for the umonitor (another monitoring tool).
Netflow: creates a new screen for the customer, adds all the branches and configures the thresholds (categories 3 and 4).
Registers the new customer and its channels with the provider teoco in order to include them in the monitoring software NETRAC.

STAKEHOLDERS: OE

*Stage 10, cmdb update:* In this step, the ME creates a new icon for the customer at the Network Managements Dokuvizs' service view.

STAKEHOLDERS: OE

*Stage 11, TEST:* The OE tests the monitoring service in order to ensure that it works properly. The test changes from client to client according to the network topology and the service category purchased.

STAKEHOLDERS: OE


### 4.3.4. Project closing group:

This group includes activities such as handing in the service to operations staff, notifying internal areas about the billing

processes and notifying the customer about starting operations.

*Stage 12,* Operational meeting: Once the configuration for the new customer passes the test, the service is ready to start the production phase, but before that can be started, the OE and SM need to have a formal meeting with the OM in order to notify the OM about the finalization of the configuration.

STAKEHOLDERS: OE, SM and OM
ESTIMATED DURATION: 1 DAY

*Stage 13*, Assurance operational meeting: As the new client is ready to start the operational phase, the OE has a meeting with the MOEs to explain technical aspects to them such as network topology, contact information, critical services and so on.

STAKEHOLDERS: MOE, OE
ESTIMATED DURATION: 1 DAY

*Stage 14, Closeout:* The final customers and the MOEs are informed when the new service starts working and from that date on, the customer starts using the Network Management services.

Figure 10 shows the PERT chart of the Network Management installation project lifecycle:
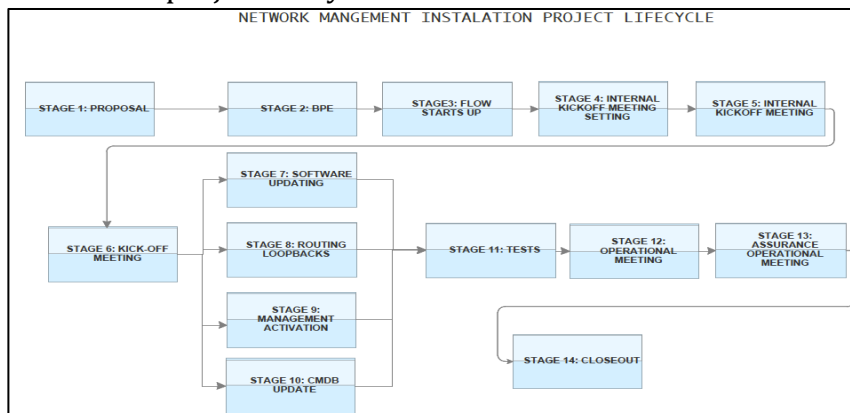


**Figure 10 Network Management PERT chart (Florian, 2013)**

Table 8 maps out the tasks and roles in a RACI matrix. As I explained in the background chapter, the RACI matrix is a tool used to map tasks and stakeholders in order to have a practical way to avoid overlaps when caring out the project tasks.

| Project R = Responsible A = Accountable C = Control I = Information | Operation Manager | Service Manager | Operation Engineer | Management Engineer | Monitoring Engineer |
|---|---|---|---|---|---|
| Activity | | | | | |
| Create the startup DKO | | RAC | I | I | I |
| Check the Network Management Elements in Siebel | | RAC | - | - | - |
| Create a folder for the new customer in Sharepoint | | RAC | A | - | - |
| Create a presentation for the kickoff meeting | | RAC | - | - | - |
| Take part in the internal kickoff meeting | | RAC | A | - | - |
| Take part in the kickoff meeting | | RAC | A | - | - |
| Create the Network Management catalog for the new customer | | RAC | I | - | I |
| Create dedicated step-by-step procedures for the new customer (only if it is required) | | RAC | A | A | I |
| Hand in scaling procedures and its contacts for the Network Management service to the customer | | RAC | I | - | I |
| Dokuviz's review and configuration (local view and Argentina) | | I | RA | C | I |
| Configure the parameters that Network Management will monitor in the CPE and communications channels | | I | RA | C | I |
| Create usernames and passwords for the monitoring tool uCommand | | I | RA | C | I |
| Request the creation of the Dokuview user profile for the new customer | | I | I | RAC | I |
| Configure the UMONITOR for the new customer | | RC | A | I | - |
| Train the new customer to use the uMonitor and Dokulight monitoring tools | | RC | A | I | - |
| Configure the flows for CPE. | | CI | RA | I | - |
| Configure the Netflow platform to monitor the new customer | | CI | RA | I | I |
| Advise the operations engineers when the new customer starts operating | | RAC | I | I | I |

| | | | | | |
|---|---|---|---|---|---|
| Let the customer know when the project is finished and when the service begins the operations stage | | R AC | I | I | I |
| Create the business case for the new customer | | R AC | I | I | I |
| Upload the business case in sharepoint | | C | I | R A | I |
| Research and describe the customer's network topology | | I | R AC | I | I |
| Take part in meetings/phone conferences to configure the monitoring of third party channels purchased by the customer | | I | R AC | - | I |
| Monitoring tests with others carriers | | I | R AC | - | - |
| Consulting meetings with Network Management customers | | R AC | A | I | - |
| Create the consulting schedule for the Network Management customers | | R AC | I | I | - |
| Agree on preventive maintenance plans and do tests with the customers | | C | R A | - | I |
| Create procedures for the Network Management Department | | I | I | R AC | I |
| Choose tools for the Network Management Department | | I | I | R AC | I |

Table 8 RACI MATRIX for the Network Management services, source LEVEL (3)

## 4.4. ISSUES THAT AFFECT THE PROJECT LYFE CYCLE

Once I identified and mapped out the tasks and stakeholders, I made two tables that map out the findings, the stakeholders and the phases of the project.

I asked the stakeholders what they think could be improved in the Network Management processes from their perspective? Based on their answers I ranked different topics according to how many times a topic was reported by a different stakeholder.

In this section, I will list and briefly explain the issues reported by the stakeholders and rank them according to the process described in the previous paragraph

Lack of workflow: All the processes in level (3) have a workflow that groups, controls and maps all the tasks involved. The Network Management workflow is incomplete.

Monitoring tools: At the moment Network Management uses more than one tool to monitor the same parameters, the same configuration is repeated using the four tools.

Lack of technical knowledge in sales: the AM and the CSM do not have enough knowledge about the scope and technical requirements of the Network Management services.

Lack of technical knowledge in the customer: Some customers do not have knowledge about their own network configuration.

Lack of communication with the customer: After the kickoff meeting there is little communication with the customer about status updates.

No control tasks in the workflow: No one is responsible or accountable in the project that controls the on-time execution of tasks.

Unrealistic installation time: Times offered by the AM do not match with the internal processes.

Misaligned tasks in the same role: The ME has two bosses: the OM who serves as the service owner and the chief in the ME department in Brazil. The objectives of those two are not always aligned.

Lack of unified criteria to prioritize and speed up tasks: As the company works according to departments, the departments carry out the task on a "first-arrive" "first-serve" basis. The priority assigned by the CSM is not valid in other departments.

Table 9 maps out the stages that are affected by the issues reported in the findings. Table 10 maps out the stakeholder's perception of those issues that negatively effect the duration of the project.

| Findings | STAGES | | | |
|---|---|---|---|---|
| | PROJECT INITIATION | PROJECT PLANNING | PROJECT EXECUTION | PROJECT CLOSING |
| Lack of workflow | X | X | X | X |
| Monitoring tools | | | X | X |
| Lack of technical knowledge in sales | X | X | | |
| Lack of customer's technical knowledge | X | X | | |
| Lack of communication with the customer | | | X | |
| Tasks not controlled in the workflow | X | X | X | X |
| Unrealistic installation time | | | X | |
| Misaligned tasks in the same role | | | X | |
| Lack of unified criteria to prioritize and speed up tasks | | | X | X |

**Table 9 Map between the stage and the issues reported in the project lifecycle (Florian, 2013)**

Table 10 Relationship between the issues found and the stakeholder effected in the project lifecycle

| FININGS | STAKEHOLDERS | | | | |
|---|---|---|---|---|---|
| | DPE | OM | CSM | SM | ME |
| Lack of workflow | X | X | X | X | X |
| Monitoring tools | X | X | X | | X |
| Lack of technical knowledge in Sales | X | | X | X | |
| Lack of technical knowledge in the customer | X | | X | | |
| Lack of communication with the customer | | | X | | |
| No control tasks in the workflow | | | X | | |
| Not realistic installation time | | | X | | |
| Miss aligned tasks in the same role | | | | | X |
| Lack of unified criteria to prioritize and speed up tasks | | | X | | |

**Table 10 Relationship between the issues found and the stakeholder effected in the project lifecycle. (Florian, 2013)**

Based on previous tables 9 and 10 I figured out that there are three main issues that negatively effect the time of the project lifecycle:

- Workflow
- Tools
- The stakeholder's lack of knowledge in the project initiation phases.

I will use these three topics in the discussion part.

## 4.5.    Summary

In this section, I presented a detailed description of level (3) as the company that I used for the case study as well presenting its service portfolio (section 4.1).

I presented a detailed description of the project lifecycle, identified stakeholders and the task every one of them carries out in the project (section 4.2).

I identified those issues that negatively effect the duration of the project lifecycle (section 4.3). After their identification, I classified them in two different ways: the stages of the project lifecycle involved (table 9) and the stakeholder's perceptions (table 10).

I finished this section by choosing the three most relevant findings. I will use them as the base of the discussion chapter.

# 5. DISCUSSION

In this chapter I will use the three most relevant findings (section 4.4) and explain how they effect the project lifecycle. In this discussion I will use the triangulation approach based on three perspectives: the internal procedures described in the findings chapter (section 4.3); the frameworks that the company wants to use in the product lifecycle, PMBOK and ITIL; and the way that projects are executed in real life.

The findings will be discussed in the following three steps: first, a detailed description; second, differences between processes in real life and the ITIL framework; third, differences between processes in real life and the PMBOK framework; and forth, the differences between processes in real life and internal standards at level (3).

## 5.1. WORKFLOW:

### 5.1.1. Description of the processes in real life:
In level (3), like in many others companies around the world, projects are based on processes which have define their activity flow in order to execute the processes or the project in an effective way.

In Colombia, Network Management Services has its own workflow, but it is not implemented according to the standards of the company. The workflow in level (3) uses an ERP (Enterprise Resource Planning) platform known as Dokuviz, this platform contains multiple software tools like the CRM Siebel and the configuration management database.

As I explained in the findings section, in the second stage (section 4.3 project lifecycle description) the CSM (Customer Sales Manager) starts the flow and creates a new BPE

(Business Process Efficiency) in the CRM (Customer Relationship Manager) for the customer. According to a standard service, the BPE starts two workflows: one of them for administrative and billing processes and the other one for the installation and configuration of the new service. I will refer to the last one as Dokuflow.

Normally, in the BPE stage CSM should fill in the parameters of the service purchased by the customer. This process is tedious and repetitive if there are a lot of branch offices. The parameters include the features of the service the customer purchased. In the case of Network Management the CSM should specify the category of the service (availability and capacity, Network Management performance, Network Management application visibility or Network Management WAN optimization).

In a normal service, the flow does not continue until the CSM fills in all this information. In Network Management, the CSM finishes the BPE task but there is a lack of continuity between BPE and Dokuflow.

To fill in the gap between BPE and Dokuflow, the OM delegates the responsibility of verifying that the BPE information is complete to the ME. This is not an optimal solution because it requires the interaction of another stakeholder, increases the risk of human mistakes and could increase the duration of the project due to a lack of communication between the OM, CSM and ME.

Once the verification in complete, the flow continues to the third stage. In this stage, the SM gathers all the technical information and contractual information to start the Network Management Dokuflow. There is no previous task which attaches the contract to the workflow, so the SM has to send an email to the CSM or AM to get a copy of the contract. Once the SM has the contract technical information is extracted and it is used to create the Network Management workflow.

It often happens that the SM has to do several internal kickoff meetings (stages four and five). This can be mainly attributed to the lack of a contract. The purpose of the internal kickoff meeting is to share information about the contract, but the lack of a contract means that it is not possible to know what the customer officially purchased until the day of the internal kickoff meeting when the CSM talks about it.

The OE executes most of the tasks related to the project execution group. The standard workflow for a service installation involves the service delivery department. Even though Network Management Services is not considered to be a common service, there are tasks than can be executed just like all the other services in level (3).

The service delivery group can execute the tasks in stage 8 without any additional training, because these tasks are the same for all customers and services in the company.

There is also an issue in the workflow regarding the software tools used in the project, but I will discuss this separately.

In the project-closing phase, there is no way to link the notification about the new service delivery with BPE in stage 2. That means that the billing activities (that are out of the scope of this project) do not start at the same time as the service is delivered. It is common that the services purchased by the customer are charged some time after the services are delivered.

### 5.1.2. Differences between practices in real life and the ITIL framework

If we compare the current practices described before with the ITIL framework it is possible to identify three issues:

Capacity management: There is an issue in capacity management because the OE executes most of the task in the project execution group, and the same OE has another task

regarding the operation phase of the product lifecycle (these tasks are out of the scope of this thesis).

Knowledge management: As is defined in the theory chapter, knowledge management processes include improving the quality of decision making and ensuring that staff members have an understanding of the values and services (Gallacher and Morris, 2012). In phases four and five, the ME has to do some reworking because the process do not bring the documents (a copy of the contract in this case) to prepare the internal kickoff meeting.

Service asset and configuration management: Nowadays the Network Management services at level (3) use five different software platforms (NETVIEW, cacti, umonitor, NETRAC and rancid). All of them have the same purpose but they will be replaced by NETRAC.

 The NETRAC platform is able to perform the same functions as the other platforms. The problem is that there are no processes for updates or maintenance of the other four platforms and there is no processes regarding asset management for NETRAC. From an efficiency point of view, it is not worth it to keep configuring the same parameters for five platforms when four of them are not going to be used anymore.

Table 11 summarizes the comparison between the findings "workflow" and the ITIL processes group.

| ITIL PROCESESS GROUP | CURRENT PRACTICE |
| --- | --- |
| Capacity management | The OE executes most of the tasks in the project execution group |
| Knowledge management | In phases four and five, the ME needs to do some reworking because the process does not prepare the documents for the internal kickoff meeting. |

| Service asset and configuration management | There are no processes for updating or maintenance for the other monitoring platforms. There are no processes regarding asset management for NETRAC. |
|---|---|

Table 11 Comparison between the finding "workflow" and the ITIL procecess groups (Florian, 2013)

### 5.1.3. Differences between practices in real life and the PMBOK framework

I compared the current practices described above with the project management knowledge areas and found the followings gaps:

Project integration management: According to the PMBOK, project integration management includes the processes and activities to identify, define, combine, unify and coordinate the various processes and project management activities within the project management processes groups (PMBOK, 2008). The lack of the correct and smooth transition between the BPE and the Dokuflow shows issues in this project management knowledge area.

Under this knowledge area fits the issues regarding the closing stages as well, where there is no way to link back the notification about the new service delivery with the BPE in the stage 2

Project time management: As there is no control and monitoring task in the processes, there is no accountability to keep track about the status of the tasks. That means that one task can remain in some department without any intervention until someone notice it. In most of the cases some notice it because the customer complains about the delivery times.

Project human resource management: the resource allocation along the execution stages of the Network Management

project lifecycle does not take advantage of the scale economy offered by the functional organization structure.

Project communications management: The information required for the kickoff meeting is no included in the tasks. This issue is also an issue for ITIL, but in ITIL it is a gap in knowledge management.

The table 12 summarizes the comparison between the finding "workflow" and the PMBOK knowledge management areas.

| PROJECT MANAGEMENT KNOWLEDGE AREA | CURRENT PRACTICE |
|---|---|
| Project integration management | Lack of the correct and smooth transition between the BPE and the Dokuflow shows issues in this project management knowledge area |
| Project time management | Tasks can remain in some department without any intervention until someone notices it. |
| Project human resource management | Resource allocation in the execution stages does not take advantage of the scale economy offered by the functional organization structure |
| Project communications management | The information required for the kickoff meeting is no included in the tasks. |

Table 12 Comparison between the project management knowledge areas and current practice "workflow" (Florian, 2013)

### 5.1.4. Differences between practices in real life and internal processes

The comparison between the processes (RACI MATRIX) and the actual practices (Table 13) shows that no one of the consulting task that the SM should perform in the sales processes are executed.

| ACTIVITY | INTERNAL PROCESS | | | | | PRACTICE IN REAL LIFE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | OM | SM | OE | ME | MOE | OM | SM | OE | ME | MOE |
| Answer doubts regarding the Network Management operation to Consultants/AM/CSM | - | RAC | A | A | - | - | - | - | - | - |
| Participate in meetings with potential customers. | - | RAC | A | - | - | - | - | - | - | - |
| Join the customer in the visits to the NM department | - | RAC | A | I | I | - | - | - | - | - |
| Send sample standard documents to the potential customers in order to show them how the reports looks like. | - | RAC | A | - | - | - | - | - | - | - |
| Take part in the internal meetings to reply the RFPs' for the potential customers. | - | RAC | A | A | - | - | - | - | - | - |

**Table 13 Comparison between internal processes and practices in real life (Florian, 2013)**

There is a gap between workflow and the sales task in the RACI matrix: While the workflow in sales does not involve the SM as a stakeholder, the RACI matrix proposed by level (3) places the SM as a consultant in sales.

The department responsible for the design of the workflow does not allow for the participation of additional stakeholders in the sales processes. The sales processes in level (3) should be performed by the AM, the CSM and the DPE.

The OE can assume the responsibility and consultancy functions in the RACI matrix and delegate them to the SM. This can be achieved by improving the human resource management process regarding workload allocation and the improvement of additional KPI by including this task as part of the workload for the SM.

## 5.2. TOOLS

### 5.2.1. Description of the processes in real life

Network Management requires the configuration of multiple configuration items. The configuration of those items require software platforms as well; a new activation in Network Management needs the configuration of seven software tools for every new service. These software tools are: Cacti, ucomand, dokuview, umonitor, dokulight, netflow and rancid.

Ucomand, netflow and cacti are used to monitor the CPE and communications channels. The three of them work in a similar way and monitor similar parameters. That means that there are three tasks in the process and the outcome is pretty much the same.

Rancid is a software tool used to save the configuration of the CPE periodically. This is useful because it keeps track of the

CPE configuration daily. Even though this tool is available at level (3), it is configured but not used in the software uploading stage (stage 7). Instead of effectively using the existing infrastructure, the OE carries out this task manually.

The OE enters the CPE by CPE, does a copy and paste of the configuration into a .txt file and then uploads it to the customer screen in Dokuviz. This process in not effective because it consumes the OE's time and the outcome is up to date automatically when the OE saves the configuration in Dokuviz.

Recently, level (3) purchased a new software platform called NETRAC from an external supplier called teoco that has monitoring capabilities and can also perform the same task related to the configuration management performed with rancid.

This new platform is mainly used for monitoring, but it also has functions that enhance tasks related to the creation of reports in the operating stage of the product lifecycle. The ME executes the configuration of this platform for the installation of a new customer, but there are no tasks related to the maintenance of the platform.

Nowadays, many services are configured in this platform at the same time. The services from the other platforms are migrated to this one and new services are configured, but there are no controls. The ME performs the tasks related to monitoring tools, but they have two administrative chiefs: one of them is the OM and the other one is responsible for the monitoring tools.

The two chiefs have different priorities: the OM is focused on the implementation of new customers while the other is focused on the maintenance of the platform. Because of this mismatch, the ME has to complete tasks that are not related to their role and sometimes they overlap each other.

This new tool is not fully operational. An external provider called teoco does the administration. Teoco takes two weeks to configure a new service. The scope of the new platform is not clear yet and it has not been defined as to when the tool will be fully operational. So, all the tools that are supposed to be replaced with NETRAC are still in use.

Additionally to the monitoring software, Dokuviz must be updated, a new folder in SharePoint must be created, the creation of the services in the CRM Siebel must be verified, and routing protocols in the CPE must be configured.

As there is a problem with flow in the ERP software, some of the data and documents that are supposed to be available on the ERP are not. In order to solve this, the stakeholders improvise excel files and share folders to allocate the information that is impossible to collect by using the ERP.

After comparing common everyday practices with the ITIL framework, I identified the followings issues:

The documentation in the SDP in not available for all the stakeholders: The CRM Dokuviz is supposed to be the tool used that stores all the information related to the service. However, nowadays the information is stored in another location using Microsoft SharePoint. The problem here is that not all the stakeholders that need access to this information have access to it on SharePoint.

Wrapping up, these are the issues regarding tools:

Reworking: Ucomand, netflow and cacti are three different platforms configured to do the same task. This can be done using only one platform.

 A lack of integration between the CRM dokuviz and CVS (Configuration Version Management).

The CRM and ERP softwares do not allow for the attachment of the documentation required for the processes.

The scope and functions of the new platform are not defined.

### 5.2.2. Differences between practices in real life and the ITIL framework

Capacity management: Level (3) is doing a good job at migrating all the services to a centralized platform that covers multiple tasks. By doing this, economy of scale is taken advantage of and this will reduce the time required to configure a new service.

What is not good is that the scope of the new platform has not been defined yet, so it is unclear which tasks for a project can be performed with the new platform. As the scope is unclear, some reworking needs to be done because the configuration for a new service is done using both the old and new platforms.

Change management: The changes in the NETRAC platform are not controlled. The Network Management processes don't have any tasks related to keeping track of the changes of the configuration items.

Knowledge management: The documentation in the SDP is not available for all stakeholders: The CRM Dokuviz is supposed to be the tool used to store all the information related to the service. However, nowadays the information is stored in another location using Microsoft SharePoint. The problem here is that not all the stakeholders that need access to this information have access to it on SharePoint.

Service assets and configuration management: There is no control over the changes made in the software platform and there is no control over what is configured. There are no clear processes for the maintenance and removal of services in the software platforms.

Table 14 summarizes the comparison between the findings "tools" and the ITIL processes group.

| ITIL PROCESS GROUP | CURRENT PRACTICE |
|---|---|
| Capacity management | The scope of the new platform is not defined yet, so it is not clear which tasks in the project can be performed with the new platform. |
| Change management | There is no task related to keeping track of the changes made to the configuration items. |
| Knowledge management | The documentation in the SDP is not available for all stakeholders. |
| Service assets and configuration management | There are no clear processes for the maintenance and removal of services in the software platforms. |

Table 14 Comparison between the ITIL processes groups and current practice "tools" (Florian, 2013)

### 5.2.3. Differences between practices in real life and the PMBOK framework

I compared the current practices aforementioned with the project management knowledge areas and found the following gaps:

Project time management: As the new platform is still in the delivery phase, the administration is done by teoco. The provider takes two weeks to configure a new service.

Project communication management: The information required for the project is not correctly stored and disposed of because the tools and password privileges used to store this information are not available for all the stakeholders that need access to this information.

Project procurement management: The conditions of the contract with teoco cause the project lifecycle to increase.

Table 15 summarizes the comparison between the findings "tools" and the PMBOK knowledge management areas.

| PROJECT MANAGEMENT KNOWLEDGE AREA | CURRENT PRACTICE |
|---|---|
| Project time management | The provider teoco takes too much time to configure a new service with NETRAC. |
| Project communication management | The information required for the project is not correctly stored and disposed of. |
| Project procurement management | The conditions in the contract with the supplier teoco increases time the in project lifecycle. |

**Table 15 Comparison between the project management knowledge areas and current practice "tools" (Florian, 2013)**

### 5.2.4. Differences between practices in real life and internal processes

The current practices and the processes tasks are the same because the process of configuring all the tools and storing information in different places is standard procedure.

It doesn't mean that level (3) is using the resources in the best way to achieve shorter project lifecycles or doing things according to the correct process. However, even if the process is not optimal or does not align with the framework, they continue to use it anyway.

## 5.3. INFORMATION

### 5.3.1. Description of the process in real life

There is some information related to the start of the project that must be collected at the earliest phases of the project. The quality of the information provided directly effects the duration of the project lifecycle. If the quality of the information is good, the projects flows smoothly, but if the quality of this information is not good or is incomplete, additional efforts are required to collect it or fix the potential deviation generated by a lack of information at the right time.

Service information

Description of the service:
- The difference between the four categories of Network Management
- The advantages of a Network Management system
- How do Network Management services create value for the customer?

The AM is responsible for first presenting the services to the potential customer, which means that the AM needs to be knowledgeable enough to talk properly about the service to the customer.

Product knowledge and its associated technical details are are important to know in order to offer Network Management services. It is possible that the AM is willing to close a new deal but their lack of knowledge about the service can create misinterpretations about the scope and features of the product.

The following information should be given to the customer and collected by the CSM and the DPE.

Customer information

- Network topology
- Technical specifications about the CPE
- Technical information about third party customers
- An understanding of which branches the customer wants to monitor
- Contact numbers for each one of the branches to be monitored

After the AM signs on the new customer, the CSM is responsible for selling the services. The CSM meets the customer several times in order to understand what his expectations are, find out what the network topology of the customer is like and figure out what the customer needs to properly integrate the service. Quite often, the CSM and the DPE meet with the customer to gather all the customer's information.

The tasks of the CSM are much easier if they have some technical background and knowledge about the services. If the CSM has a lot of technical knowledge, the participation of the DPE decreases.

Sometimes the customer does not have the technical background or does not know the topology of his network in great detail. This lack of technical knowledge can lead customers to make assumptions about the delivery of the services.

Problems occur when assumptions are wrong and additional changes are required in the latest stages of the project life cycle or if the service does not comply with customer expectations.

In case the customer has questions about his topology or other technical details in the CPE, the CSM must solve these questions by involving the DPE and gathering the information for a consultation.

In case the AM, the CSM or the customer have questions, or are not sure about the information, the CSM the DPE to act as a consult. These questions regard technical topics like the following:

Consultancy information

- How can Network Management help the customer with an issue?
- How can Network Management improve the efficiency of the communications networks?
- Does the CPE comply with the requirements for Network Management installation?
- Is the service able to perform something specific that the customer requires?
- Other questions about the technical features in the customer's network.

Supposedly, the AM and the CSM can require help from the DPE in order to answer questions about the specifications of the services. In some cases, when the AM goes to visit the customer, the DPE joins the AM in order to more clearly explain what services are offered and to help solve questions right away.

Because of tight time schedules or a lack on capacity as part of the DPE role, it is not always possible to have the DPE join the meetings with the customer. When that happens, the AM or the CSM have to do their best in order to solve the customer's questions.

Issues regarding a lack of information arise when the service information, customer information or consultant information is incomplete. Because of that, additional resources are

required in the execution stages of the project to correct the deviations generated because of the lack of information at the right time.

### 5.3.2. Differences between practices in real life and the ITIL framework

If we compare the current practices previously described with the ITIL framework it is possible to identify three issues:

Knowledge management process: This process is effected because the information is not delivered at the right time for an appropriate decision making process to take place. Also, the AM and CSM stakeholders do not share a common understanding of the services.

Table 16 summarizes the comparison between the findings "information" and the ITIL processes group.

| ITIL PROCESSES GROUP | CURRENT PRACTICE |
|---|---|
| Knowledge management | The information is not delivered in time for an appropriate decision making process |

Table 16 Comparison between the ITIL processes groups and current practice "information" (Florian, 2013)

### 5.3.3. Differences between practices in real life and the PMBOK framework

I compared the current practices described above with the project management knowledge areas and found the followings gaps:

PROJECT HUMAN RESOURCE MANAGEMENT: According to the RACI matrix the SM should take part in stages one and two and bring consulting and support for questions from the AM, CSM and the customer.

PROJECT COMMUNICATION MANAGEMENT: The collection and distribution of the information is not done in the right time.

The table 17 summarizes the comparison between the finding "information" and the PMBOK knowledge management areas.

| COMPARISON BETWEEN THE PROJECT MANAGEMENT KNOWLEDGE AREAS AND CURRENT PRACTICE "INFORMATION" | |
| --- | --- |
| PROJECT MANAGEMENT AREA OF KNOWLEDGE | CURRENT PRACTICE |
| project human resource management | SM should take part in the stages one and two but this does not happen. |
| project communication management | The collection and distribution of the information is not done in the right time. |

Table 17 Comparison between the project management knowledge areas and current practice "information" (Florian, 2013)

## 5.4.   SUMMARY

In this section I use the three most relevant findings reported by the internal stakeholders in the project lifecycle and made a comparison between the findings (real life), framework that level (3) want to achieve and the standard procedures or the "ideal procedure" (RACI MATRIX table 8).

The comparisons are summarized in tables 11 to 17. I will use these tables in the recommendations chapter to give some advice on how to improve the processes in the Network Management workflow for the installation or delivery of a new service.

# 6. CONCLUSIONS:

By writing these conclusions I will link the research question formulated and described at the introduction of this master's thesis and describe the extent in which the research question was solved.

Research question 1: Undertake a literature review of theories and approaches with relevance and interest in the problem to be addressed by this thesis.

I choose two frameworks adopted as best practices in Information and Communication Technology (ICT): ITIL and PMBOK. I choose these two frameworks because of their success in telecommunications companies in Colombia and also because nowadays most of the RFP from the public and private sector require it.

Even though ITIL is oriented towards the product life cycle as a whole, this framework recognizes that the service transition stage should be executed under a project management approach. In the same manner, the PMBOK explains the differences between projects, operations, project lifecycle and product lifecycle. The PMBOK links projects with product lifecycle by explaining that a phase in the product life cycle can be carried out as one project or as multiple projects.

Through an analysis of the two frameworks, I realize that both of them are process oriented and there is similarity between the groups embedded in the project management areas of knowledge in the PMBOK and the processes that conform the IT service management framework in ITIL. Both of them define processes for the management of risk, scope, procurement, finance, knowledge and information.

Research question 2: Carry out a case study to describe current practices, methods, measures and techniques being applied in order to shorten the life cycle of

telecommunications projects. What are the potential effects on the project life cycle of each measure?

The approach I used to carry out the case study is described in detail in the methodology chapter as well as in the description of the company and in the product I focus my research on.

Even though it was not possible to interview the stakeholder in level (3) that is responsible for the design and management of the WBS (Work Breakdown Structure), the stakeholders that participated in the processes gave feedback about what measures could be taken to reduce the project lifecycle.

The measures taken to shorten the project life cycle are explained in detail in the recommendations chapter, but mostly they focus on aspects: first, the improvement of the workflow; second, project communication management and service asset; and third, configuration management.

Research question 3: Describe the different processes and phases of an IT project and identify which has the highest potential for and the greatest effect on reducing the life cycle.

I described the project lifecycle and the workflow in the first part of the findings chapter. The process lifecycle fits into the general lifecycle structure defined by the PMBOK.

From the case study, I identify that the processes with the greatest effect on shortening the project lifecycle are those enclosed in project integration management.

The Network Management workflow is beyond the company standard. The current workflow is not efficient because the project practitioners need to manually link the activities and gather information that is supposed to be gathered by the CRM.

When the project practitioners do the work by hand, they use tools and platforms that are not included in the standards. By

doing this, the project information is not disposed of in the platform for the communication management processes.

From the case study, I identified that the processes with the highest potential on reducing the project lifecycle are related to service asset and configuration management.

The unification of the monitoring tools, report creation and backup-configuration leads to resource optimization because the task related to configuring monitoring tools decreases from five to one and the configuration of the CVS (Concurrent Version System) can be done within the same platform.

The unification of the monitoring tools is cost-effective because the same platform will create the data-input for the report that Network Management presents to the customer in the post-implementation stages of the service lifecycle.

By having a more efficient workflow and efficient processes for service asset and configuration management, it is possible to redistribute responsibilities covering the tasks related to consulting in the initiation phases of the project without increasing the project team members.

Research question 4: Evaluate if there is any organizational support tools for IT projects or functions that are vital for shortening the project life cycle.

Level (3) has organizational tools to reward employees based on yearly performance evaluations; they also have training programs for their employees.

By aligning the objectives in performance evaluation and by encouraging the project team to take part in the training programs, both tools can be used to reduce the project lifecycle. The use of these tools can help, but it is not considered vital in reducing the project lifecycle.

Another tool is the KPI; The Network Management area has internal KPI that helps to identify the workload per employee

and has better input for decision-making regarding capacity management aiming to reduce the project lifecycle.

From the case study I concluded that the set of tools regarding CRM, CMDB, and ERP (Enterprise Resource Planning) are vital software tools, which keep project task and process information organized.

Research question 5: Evaluate the role and responsibility of the project management office when it comes to implementing and executing actions that may reduce the project life cycle.

As I mentioned in the introduction, my supervisor and I decided to remove this research question from the scope of my master's thesis. Even though the project management office is a fascinating topic, the time frame of one academic semester is not enough and the contribution of this question is vast enough to be considered it's own topic for further research.

Additionally, from the research questions formulated in the introduction, I made additional conclusions based on the case study. I will present these conclusions in the following paragraphs.

The complexity of the service allows for the absence of a project manager role in order to carry out the satisfactory delivery of the services. In more complex scenarios, where more services require being installed, level (3) offers project management as an additional service.

As long as customers do not require a project management approach for the installation of the services, the actual approach (described in section 4.3 in this document) works. It is necessary to make some improvements in order to achieve an effective installation.

The Network Management services focuses on the operational stages of the product life cycle; these are based on the ITIL

framework. The fact that the operation of service is based on ITIL is more attractive to the customer than the methodology the company has used for the implementation of services.

## 6.1.    FURTHER RESEARCH

While working on how to reduce the project lifecycle in telecommunications companies throughout the semester, I realized that there are interesting topics regarding software tools that can help improve either processes or the whole project lifecycle. In the following, I will go through the topics I consider relevant and interesting for further research:

- I found that improvements in usage of software tools for project management in the functional organization structure and in weak matrix organization could compensate for a lack of a proper figure for project management and improve the distribution of tasks among the project members.

- How to prioritize tasks for a project in a function based organization.

- How software tools can lead to improvements in controlling tasks in a function based organization where project management tasks are distributed among the project members.

- How to improve the analysis of stakeholder expectations for these kinds of projects.

# 7. RECOMMENDATIONS

In this chapter I will use the findings, discussion and conclusions to make recommendations for level (3) on how to improve the actual processes and reduce time spent in the project lifecycle.

I will focus on the three main findings I used for the discussion: software tools, workflow and knowledge.

## 7.1.  Tools

Define the scope of the NETRAC platform regarding the following three aspects:

CVS (Configuration Version System): Nowadays the OE configures RANCID to save the configuration of the CPE. Then the OE manually uploads the configuration to Dokuviz. The platform NETRAC has the same CVS features as RANCID, but they are oriented on an ITIL compliance basis. That means that if level (3) wants this feature they have to pay for it.

Integration between the CRM and the CVS: RANCID or NETRAC and Dokuviz should be integrated in order to copy the configurations from the CPE to DOKUVIZ automatically. Level (3) should first define which tools they are going to use for the CVS and later follow internal processes which request the integration between the CRM and the CVS.

Centralize the monitoring tools: Network Management monitors the CPE with different tools that do the same thing at the end. These tools are NETRAC, cacti, NETVIEW and umonitor. The ME (Management Engineer) is migrating services to NETRAC because that tool will be the official used by Network Management. As Network Management already has a official tool for monitoring, they must stop making configurations using the old tools because it does not make

sense to use a platform that is not going to be used in the future.

Network Management should speed up the migration from old platforms to NETRAC, remove the configuration of additional tools and incorporate the configuration of NETRAC into the workflow.

Reduce the time the provider teoco takes to configure NETRAC: The responsible person in Network Management or level (3) should renegotiate the terms of the contract signed between level (3) and teoco in order to reduce the time it takes to input a new customer in the NETRAC console. Nowadays, this takes two weeks.

## 7.2.    Workflow

The workflow should be standardized according to the internal parameters of the company in order to avoid the gaps produced when the CSM creates the BPE but the workflow does not begin using dokuviz.

Once the workflow is standardized, the delivery department and the engineering department should be included as is done in the delivery of the other services in level (3).

## 7.3.    Knowledge

Information required in the project: The information required in the project could be collected in earlier phases:

Copy of the contract: the CSM can upload a copy of the contract when the CSM creates the BPE in the second phase. By doing this, the SM does not have to come back to the CSM and ask for this document. By having access to this document, the number of kickoff meetings can be reduced to one.

Contact matrix: the CSM should ask for the contact matrix from the customer and include it in the BPE.

Consultancy tasks in sales: Once level (3) fixes the gaps in workflow and optimizes the use of the monitoring tools, it is possible to reduce the tasks in the processes related to the configuration of tools and incorporate the tasks related to the sales processes.

By doing this, the sales processes will have the technical knowledge and expertise from the SM who will be able to identify the technical details that are not easily recognizable but have a great impact on the planning and execution phases.

The SM also will be able to explain the features of the Network Management services better including how the service gives value to the customer and solves all the doubts that can potentially cause later delays in the delivery of the services.

Annex A6 and A7 propose the new workflow and the new RACI matrix.

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# 9. APPENDIXES

## 9.1. A1 SERVICE MANAGER INTERVIEW

**Q: Description of the task in the Network Management delivery process:**

He is the owner of service level management processes.
He is in charge of the customer relationship.
He coordinates kickoff meetings.
He completes the formal delivery of the Network Management services.

**Q: Responsibilities of new activation of Network Management services?**

Check for the third time to make sure that there is revenue for the new product.
Start the Network Management flow.
Set up the technical meeting with the TAM and the OE.
Set up the meeting for the delivery of the services.
Close out the delivery processes formal start up of the operation.

**Q Could you tell me a bit more about the service order startup?**

They verify that the " service instances" are included.
They verify how many branch offices and services were hired.
They design the dko to work in parallel with administrative processes.

**Q: Are there any bottlenecks due to a lack of information?**

There is no way to modify the dko after it has been sent. For instance if the customer realizes that he needs to cover 50 more branches, the existent dko can not be modified. The dko of the new 50 branches must be part of a new one.

The activation is not complete until the OE finishes the technical configuration.

The stakeholder NETRAC takes two weeks to activate the monitoring of the new services.

The contact matrix must be handed in before the service starts the operations phase. The accountability and responsibility of this is on the customer.

**Q: What can you improve in your role to decrease the marketing time for Network Management services?**

Have access to the contract before the kickoff meeting; this info can be added to the workflow. By doing this the time for the kickoff is reduced.

Nowadays, there are three internal kickoff meetings. By having the contact attached to the workflow, and by having previous knowledge of it, the number of kickoff meetings can be reduced to one.

## 9.2. A2 DATA PRODUCT SPECIALIST INTERVIEW

**Q: Please describe the tasks you complete for the activation of a Network Management service.**

Sales: The product specialist is responsible for verifying that the network of the customer understands the requirements for the installation of the service. For example, that they know how to check the features of the routers in the customer's network otherwise, any additional CAPEX should be included as part of the RFC reply.

The product specialist also goes with the CSM to technical meetings to listen to customer requirements and to identify additional requirements that the customer probably may not have realized in an effort to deliver the appropriate Network Management products.

Prices: When repaying the RFC, the Data product specialist is responsible for setting the price calculations for CAPEX and OPEX, and ROI.

At the kickoff meeting, it is important to share the details of the proposal sent to the customer with the internal stakeholders so that a common understanding about what has been sold is achieved.

**Q: Could you please name those stakeholders involved in the reply of the RFP?**

The AM and the data product specialist are involved in the reply of the RFP, but the data product specialist can ask for a TAM consultant when there is something out of the data product specialist's knowledge.

**Q: Does the person responsible for the purchasing processes on the customer's side have the required knowledge to solve technical questions about the network?**

There are the two kinds of people responsible for the purchasing processes: someone with the technical background and expertise who knows exactly what is needed, and someone with limited technical knowledge that is deciding what services to choose from the level (3) portfolio.

**Q: What happens when the customer expectations are higher than the features of the Network Management service?**

It depends, if it is possible to fulfill the requirements with current resources, the Data Product Specialist (DPS) authorizes to sell the service according to the new requirement and the customer is informed, but if it is not possible to fulfill the requirements by using current resources, then it is impossible. If the new customer needs to buy additional hardware, the data product evaluates if it is economically possible.

**Q: When the AM goes to the service portfolio presentation is there anyone from data product with the AM?**

No, most of the time the AM has some basic training about the services, but this basic training is not enough. As the AM does not know technical specifications about the service, when the customer asks the AM about technical details, most of the time the answer is "yes". This is very common in order to open a contract with the customer even though the AM is not certain and fake expectations are created on the customer side, which was discusses as being a problem.

**Q: How do you deal with situations where the customer's needs are not meet by the service?**

The AM is in charge of explaining to the customer what he bought and why the service does not meet the requirements.

**Q: Do you have some participation in the internal and external kickoff meetings?**

In the internal meeting, the customer's purchases are shared with the internal stakeholders.
The data product specialist also emphasizes the lack of the workflow.

**Q: What kind of measures can be taken in order to decrease the time spent on the Network Management project delivery?**

Avoid the use of templates for new purposes. Sometimes, because the AM is in a rush, the AM has a template they use to reply to the RFP. The AM modifies two or three lines according to the customer's needs. It works, but there are times when it does not work. As there is no defined task that states that the data product specialist must review the proposal before the AM submits it, the proposal can be incorrect.

**Q: Is there any way to improve the sales processes by getting more info about the network?**

Of course it is possible, but it must be in collaboration with the customer, because the customer has more knowledge about third parties in the network.

**Q: What else can be improved to reduce the time spent to market the Network Management services?**

It is very difficult to configure new customers with the current software platforms used by Network Management.

More information is needed concerning the workflow and the type of service desired by the customer.

The tasks for Network Management services are done by mail due to the lack of standard workflow.

There are two types of Network Management specialists including marketers and customers. Marketers are those who do not have assigned customers, they do not create RFP, they

are responsible for the products. They are responsible for the marketing of the product and they set the prices for the services.

There is no a standard for the time it should take to do a RFP in Network Management, sometimes there is not enough time and the data product specialist sends the RFP based on a little bit of information from the customer.

## 9.3. A3 CUSTOMER SERVICE MANAGEMENT (CSM) INTERVIEW

**Q: Mention your tasks related to the sale of a new Network Management service?**

As we said before there are two roles in the sales department, the account manager (AM) and the CSM customer sales manager. The account manager is responsible for getting new customers. Once the AM has sold the new service; the CSM takes care of the same customer and must guarantee that the services are delivered according to customer expectations.
The CSM has some tasks that are part of the closure of the project; he is responsible for formally closing out the project and starting to bill the services.
When the CSM sells communications services, he also offers Network Management as a complementary service. When the customer is interested in this service, the CSM starts gathering information about the needs of the customer and how the Network Management service can fulfill these needs.
The CSM is responsible for starting the flow in the delivery of the service. This is done using the CRM Siebel.

**Q: As a CSM do you have access to DOKUVIZ?**

Yes they have access. The CSM starts the flow on SIEBEL called BPE (Business Process Efficiency), and the BPE automatically starts two flows: one for the billing and

administrative processes, the other is the DOKUVIZ flow that starts the delivery of the service. In the BPE the description of the services sold to the customer are specified. When the service is delivered, DOKUVIZ sends a notification back to the CSM regarding the delivery of the service. With this notification, the CSM closes the SIEBEL task and the service starts the billing processes.

The CSM also recognizes the lack of a proper flow for Network Management services:

In the CRM every customer has two types of accounts: a billing account and a service account. The billing account splits the services into groups according to how they will be charged and which currency they will use. The services are grouped by "service instance".
In the Network Management service, the name of the instance is managed services, this instance groups the four types of services in Network Management. As there is not a proper flow, it is possible that the customer purchases the "availability and capacity" service, but in order to gain future contracts or to gain the confidence of the customer the CSM registers for a better service like "WAN optimization". This is done without the control of the CRM. Jean Piert does this control by hand.

**Q: How do you deal with situations where the service does not meet the customer's expectations?**

This happens very often. When the AM is working on sales activities, they do not go into details about customer needs. For example, when the customer purchases an internet service, level (3) delivers it, but the real needs of the customer were internet + firewall + switching, but the customer did not know about it and the AM did not suggest it.
The CSM is responsible for solving these issues. At the same time the CSM tries to solve the issues, he also tries to sell new services. In this situation he also sells the firewall and the switching solution.

The CSM is responsible for the details and asking about the customer's needs.

The technical knowledge and expertise of the CSM helps the sales processes because the CSM gathers more information and less intervention is needed from data product.

Most of the time the customer lacks technical knowledge, and that's why there are misunderstandings when the service is delivered after it was purchased. Therefore, there are also consultant activities that are covered between the CSM, the AM, the TAM and the product specialist.

## Q: What happens to the initial time-to-market expectations?

The deadlines offered by the sales department are hardly achievable. As the company has a department-oriented structure, the tasks go to each department according to the workflow and the tasks are executed on a "first-come, first-served" basis. If one task needs priority in the department, it has to be given priority, but there is no one responsible for the designation of priority.

## Q: Is it possible to prioritize the projects?

Yes, there is a process in the sales department. Every week a CSM leader sends an excel chart that contains the ongoing sales, every CSM creates a list of their top five priorities. The parameters the CSM uses to prioritize are not fixed, so it changes from CSM to CSM. The departments do not share the same priorities. For instance, in the delivery department the most important services are those that represent the highest incomes.

## Q: Does Network Management have a way to prioritize the delivery of services?

For sure they do, but it is not according to income because of a lack of proper flow, it is not possible to see how much a

customer is charged for the service. There is no way to determine how much each service is worth.

**Q: When the CSM identifies the need for additional services, how are these additional services charged if the contract was already signed by the customer?**

There are two types of contracts: a frame contract and a services contract. It is written in the frame contract that level (3) will provide services to the customer. Each service is detailed in the service contract.

**Q: What happens when the CSM does not have much technical knowledge?**

In this case, the data product specialist must play a bigger role.

**Q: Are there any formalities for the closing stage of the project?**

Delivery has some formalities, but this is not effective. There is a document called the "acceptance letter". This document is the physical proof that begins the billing process.  The problem here is that this document is not sent to the customer as soon as the service is delivered, this task goes into the "first-come, first-served" pile. That means that several days can pass while the customer recieves the service for free until the letter is sent and delivered to the customer.

**Q: Does someone from the Network Management staff communicate with the customer during the delivery of the service?**

According to the CSM the answer is no. The tasks related to updates concerning the project status are done by the CSM due to a lack of communication from the Network Management staff.

The CSM has to do tasks related to communication and some internal tasks for controlling. Because of a lack of efficient workflow, there is no one in charge of this controlling task. Nowadays this is done by "good will".

**Q: Is it possible to gather information related to the design phase in the sales phase?**

It is possible, but because the service is considered as a "plus", little attention is made to gather it.

**Q: What happens when the project stops due a technical problem in the customer network?**

The CSM notifies the customer of the problem and the service will not operate until the technical issues are fixed.

**Q: From your point of view what can be done to decrease the time it takes to deliver the Network Management service?**

The first thing would be to create an efficient process workflow following the standards of the company.

**Q: What kind of tools can help you to improve the sales task you are responsible for?**

Training: At this moment most of the CSM think that Network Management is a complementary service and do no realize the scope and features of the product so they miss out on business opportunities. Most of the CSM do not understand the importance of a network monitoring or a Network Management platform.
Guidance or direct involvement from the Network Management staff in the sales tasks.

## 9.4.   A4 OPERATIONS MANAGER INTERVIEW

**Question: Could you describe the tasks that you are responsible for regarding the installation of a new Network Management system?**

Consulting: It is quite usual that the sales-man asks for some information about the product and for an internal consulting service in order to improve a RFP by including Network Management services.

Capacity assessment: The sales area usually talks about when a new customer is going to purchase a Network Management system. This initial information enables the operations engineer to complete a capacity assessment beforehand.

Service management assignation: The operation manager is responsible for assigning the service manager to a new customer according their capacity assessment and workload. The OM is also accountable for the assigning the operation manager. The operations coordinator is responsible for assigning the operation-engineer.

Because of the hierarchy and connections within the company, the operations manager intervenes when there is a bottlenecking event that someone in the Network Management department cannot solve. A example includes talking with other areas or with the customer when a task needs to speed up or when the service can not be delivered on time.

**Question: Does the AM and CSM use the same CRM as the project team?**

No, the sales person only uses the CRM SIEBEL, but the project team uses an ERP tool known as DOKUVIZ.

**Question: According to the general description of the process, there is a task that verifies information before it**

**is assigned to a service manager. Could you explain what that task is?**

Due to the lack of an efficient workflow that links together all the tasks, the operation manager is accountable for verifying that the following information has been entered properly by the sales person in the CRM before the implementation phase of the project starts:

- Management service: This is the type of service the customer purchased.
- BPE.
- Revenues.

The objective of this task is to ensure that the service was sold according to regular procedures within the company.

**Question: Does the installation of a Network Management service require a project manager?**

Network Management services do not require a project manager for the project life cycle. Instead, the service manager carries out the tasks related to project management.

**Question: Is there a situation where a project manager is used to deliver new services?**

There is a new service in Network Management called "project management". This is project management on demand. For instance, when a customer purchases several services like satellite stations, routers and VoIP it is understandable that a project manager would be needed. However, this project manager is included as an additional service. It is also possible that the customer only purchases the network management service, for instance, when the customer installs 200 new branches with another ISP like telmex, and the customer doesn't have the capacity to deal with the project.

The service manager has to manually input all the information about the services the customer purchased and start a new workflow that works with the company's standard workflow.

**Question: Is there any standard that the customers require in the RFP for the implementation or operation of services?**

Most of the governmental entities ask for the following structure:

- Project implementation: PMI
- Operation: ITIL or ISO20000
- Security: ISO27000

**Question: What measures or techniques can be implemented in order to reduce the time of the project lifecycle in a Network Management service?**

Create a web-based tool that helps the customer purchase the Network Management product with little assistance from the sales department.

Once the ERP problem is solved and NETRAC is full-operational, the service managers and in general the Network Management engineers can use this time to promote and focus on consultanting services in order to promote the Network Management services to customers.

**Question: Does Network Management use standard templates for task configuration?**

Yes they do. A clear example of this are the templates the ME uses for the configuration of the CPE.

**Question: Why doesn't Network Management use the available software to automate tasks in the Network Management workflow?**

In case of RANCID, Network Management uses it but there is no integration between RANCID and DOKUVIZ. Level (3) has not made an effort to solve it because recently level (3) purchases a platform called NETRAC that has the function of RANCID but fits into ITIL specifications.

**Question: Is the tool NETRAC operational right now?**

Level (3) purchased it one year ago and the new platform will include reports, CMDB and monitoring. Today there is one module that is completely functional FAM (Fault Alarm Module).

**Question: What happens when the customer requires out nonstandard services?**

In case the customer has a nonstandard requirement, the data product specialist is responsible and accountable to approve it.

## 9.5.    A5 MANAGEMENT ENGINEER INTERVIEW

**Question: Could you describe the tasks you complete for the installation of a Network Management service?**

Because of the scale economy, the companies want to "do more" with the same or less resources, which means that sometimes employees are accountable for activities that are not included in their roles. Level (3) is not an exception.

There are four management engineers that work in the South American region; they cover issues related to monitoring tools, continuous internal improvement, and internal KPI and process optimization. Each engineer has different responsibilities; they are accountable and responsible for different topics:

- Training and workflow optimization.
- Monitoring platforms.
- Monitoring platforms special customer: BANCOLOMBIA.
- Creating and using templates for reports in NETRAC.
- Measuring the internal KPI.

**Question: How many platforms does Network Management have for monitoring?**

Nowadays Network Management has three different monitoring consoles they use: umonitor, hall and Cacti. In the end they have the same purpose, which is to monitor events in the communications channels or measure some detailed parameters in the communication channel. This situation is not ideal because in order to enter a new customer into the Network Management system, the management engineer and the operations engineer have to do the same task three times. In order to eliminate this reworking, level (3) purchased a new platform called NETRAC. This new tool does the job of the three others platforms and is also used to measure the KPI

and parameters for the reports that Network Management offers as part of their services.

As NETRAC is still in the implementation process, there are some problems because some customers do not have all their branch offices set up to use the new tool and therefore the measurements of the KPI are not accurate. This is because the task of configuring the customer in NETRAC and the tasks related to the reports are not executed by the same person, so what can happen is that the customer has all its branch offices monitored in NETRAC but only half of them are measured in the reports because the engineers did not talk to each other about the total number of branch offices that are configured in NETRAC.  In the end, this problem is fixed by properly configuring the tool.

There is another problem regarding chain of command. According to the roles, the head of the Network Management Department is the Operations Manager, but there is another person in Argentina that is said to be a second boss. That means that sometimes the objectives of the two bosses do not match. Sometimes they have different or contradictory objectives. Evidence of this issue is that the OM focuses on the tasks related to the implementation of new customers, while the other boss is focused on the maintenance of the platform. In order to fix this issue, level (3) is working on the creation of a new role that filters and aligns all the requirements for the management engineers.

There is another problem related to the workflow. When the salesperson or AM sells the product, there should be a CMDB or a CRM that keeps track of the new service. That is the way it works for all the other products in the company. For Network Management it does not work like that because the workflows for Network Management are not included in the CMDB.

What they do to fix this is to create a dynamic table in excel where the salesperson registers the new customer and a parameter known as instance. Instance is a unique serial

number that describes the class of the service that the customer purchases. The management engineer checks over this information with the salesperson in order to verify what type of Network Management the salesperson sold to the customer.

**Question: Are you responsible for some tasks in other stages of the project?**

After the management engineer finishes checking over the information, the operations manager assigns a service engineer for the new customer. In other words, the operations manager is accountable for the task and the management engineer is responsible.

**Question: Can you identify any issues that negatively impact the duration of the project lifecycle?**

The workflow starts in the CMDB after the operation manager assigns a service manager to the new customer, the service manager creates the dokuorder that will generate all the tasks for the Network Management workflow. This is one of the biggest problems as there is no workflow that the salesperson can use for Network Management, instead the operations manager "somehow" deals with that by using temporary solutions using dynamic tables and manhours to compensate for an inefficient workflow situation.

**Question: Who is responsible for the design of the workflow in Network Management?**

Ailton, is responsible for the design of the workflow. He is the Tools and Process Engineer in Brazil. Again, the workflow is not included as a part of the normal process according to the company standards.

**Question: Is it possible to modify the workflow in Network Management?**

It is possible, but the workflow should be designed according to the existing workflow within the company. For example, a good practice might be to adapt the Network Management workflow to the existing workflow used for the delivery of a standard service. The workflow should be approved and designed by another area in the company.

**Question: From your point of view, how the time to market be reduced?**

By improving the workflow it is not necessary to recheck that the BPE is associated to the services sold by the salesperson. Instead of that, the system forces the salesperson to register that information.

By unifying the monitoring and KPI measurement in NETRAC, the Operations and Management Engineer reduce the tasks associated with the configuration of the monitoring tools because the same configuration does not take place in three different platforms.

To improve and consolidate the internal KPI of one person, a KPI are designed to measure how well a company or person performs a task, In Network Management the KPI for each role are different. For instance, the KPI for the Operation Engineer are related to the hours of support and work orders. The Service Manager's KPI are related to the amount of visits to customers and to how many DKO they create. If the KPI are measured precisely, the operation manager can perform the capacity assessment easier.

There is a bad practice regarding who is accountable for the KPI. For instance the KPI related to the monitoring engineers are provided by the outsourcing manager and the KPI related to the service manager are provided by the management engineer and so on. As this is not unified, it usually happens

that the outsourcing coordinator asks the outsourcing engineer for KPI that are not under his responsibility.

Level (3) is oriented to processes and workflows, not projects. They only do projects if the customer requires it by contract.

**Question: Are there any plans to implement a PMO?**

Nowadays there is an incentive to start a PMO for oil & gas customers. When a customer requires a project manager by contract, level (3) hires (on demand) a project manager for the single project. The idea is to gather the knowledge the project manager needs to start the PMO.

## 9.6.    A6 PROPOSAL FOR NEW PROJECT LIFECYCLE

This section consists of the changes suggested in the stages of the project life cycle. I will only list those that changed; those that are not mentioned here remain the same.

Stage 1, proposal: In this stage the AM receives the RFP from the customer. The AM together with the DPE and the SM creates an economical proposal in order to fulfill the customer requirements and reply the RFP. It is important to remember that this step will fulfill the customer expectations as long as they fit into the products, services and utility margins.

STAKEHOLDERS: AM , SM and DPE.

*Stage 2, BPE:*  If the customer approves the proposal, the AM informs the CSM about the new service and the CSM starts a workflow in the CRM SIEBEL. This workflow is known as Business Process Efficiency (BPE). The BPE starts two new workflows: an administrative one, regarding billing activities and a technical one, regarding a request for the installation of the service.

 Once the technical workflow starts, the OM gets a notification by e-mail about it and chooses a SM for this new customer. This choice must be in accordance with the current workload for the SMs. As the OM is accountable for the Network Management Department, OM checks over revenue and cost estimations.

The OM delegates the responsibility to choose an OE for the new client to the OC. This choice is made according to the current workload of the OEs.

In parallel, TAM starts a dko to create the loopback interfaces in the CPE and route them to BBIP. The loopback interfaces might already exist, and in this case the dko is only accountable for the routing task.

The CSM must include the following documents in this stage:

- The contact matrix
- A copy of the contract

STAKEHOLDERS: CSM, OM, TAM and OC.

Project planning group: This group includes tasks to gather technical information about the client, the stakeholder's identification and participation in meetings, which express customer expectations and contractual details.

Stage 3, flow start up: the SM and the OE perform the following tasks:

OE
Checks over the existing engineering design in the CRM Dokuviz.
Understands the network topology for the new client; this task needs the participation of the TAM.
Does the inventory for CPE (Customer Premise Equipment), branch offices, and communication channels that will be included in the Network Management service.
Calculates the media of the trouble tickets based on historical records, this only applies to old customers at level (3) that purchase Network Management. This information will be an internal reference used to compare the same parameter after Network Management implementation.
Fills in the previous information in a excel format called "P8CHECKLIST" and uploads it on Dokuviz.

SM
Requests that the IT department includes oneself (the SM) in the e-mail distribution list to receive ticket notifications

STAKEHOLDERS: SM, OE and TAM.

*Stage six, kick-off meeting:* This is almost the same as the internal kickoff meeting but it includes the customer. The following information is achieved:

- A contact matrix for every branch office, provided by the customer
- A checklist to trouble-shoot channels provided by another carrier other than level 3.
- A request for SLA and MTTR for the other carriers.

The SM hands in the hierarchical structure of level (3) to the customer. This acts as a reference guide showing whom the customer should talk to in case complaints are not answered in the proper way.

Agreements about the reports are checked again and submitted to the customer, including its periodicity, the KPI to measure and so on.

STAKEHOLDERS: AM, CSM, DPE, OE, DPS, SME and customer

Project execution group: Contains tasks related to carrying out the work to configure and deliver the service.

*Stage 7, Software updating:* In this stage, the OE updates the configuration management databases at level (3). This stage includes the following tasks:

The OE manually updates the contact matrix in the customer's main view in Dokuviz.

The OE updates the layout of the customer's main view in Dokuviz according to the Network Management standard. This standard consists of sets of features and codes that help the OE easily understand the network topology and the monitored services in the CMDB.

The OE uploads every CPE configuration at every branch office, including the corresponding location in Dokuviz.

STAKEHOLDERS: OE.
STIMATED TIME: 5 TO 10 DAYS

*Stage 8, Routing loopbacks:* In this stage, the OE does the entire routing configuration for the new customer.

The OE should check all the loopback interfaces according to the TAM specifications.
The OE routes the loopback address from the CPE at every branch to the NETRAC server.

STAKEHOLDERS: OE.

*Stage 9, Management activation:* In this stage, the OE completes the monitoring software configuration for the new customer.

Configure the new customer in the NETRAC platform.

STAKEHOLDERS: ME.

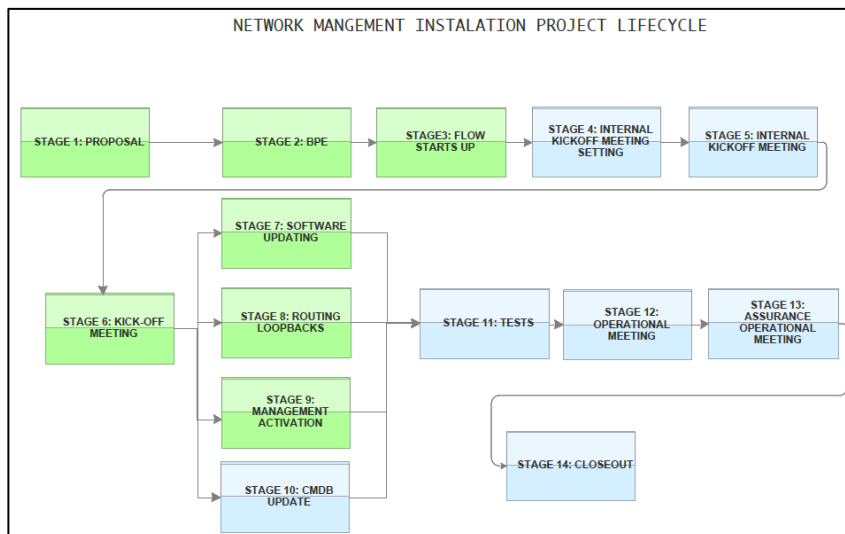Figure 11 shows those stages that were modified in green.



**Figure 11 New PERT chart (Florian, 2013)**

## 9.7.  A7 NEW RACI MATRIX

This is the new RACI matrix that I propose for the Network Management process

| | R = Responsible | A = Accountable | C = Control | I = Information | Operation Manager | Service Manager | Operation Engineer | Management Engineer | Monitoring |
|---|---|---|---|---|---|---|---|---|---|
| **Activity** | | | | | **O. M.** | **S. M.** | **O. E.** | **M. E.** | **M O E** |
| Create the presentation for the kickoff meeting. | | | | | ? | RA C | - | - | - |
| Take part in the internal kickoff meeting. | | | | | ? | RA C | A | - | - |
| Take part in the kickoff meeting. | | | | | ? | RA C | A | - | - |
| Create the Network Management catalog for the new customer. | | | | | ? | RA C | I | - | I |
| Create dedicated step-by-step procedures for the new customer (only if it is required). | | | | | ? | RA C | A | A | I |
| Hand in the scaling procedures and its contacts for the Network Management service to the customer. | | | | | ? | RA C | I | - | I |
| Dokuviz's review and configuration (Local view and Argentina) | | | | | ? | I | RA | C | I |
| Configure the parameters that Network Management will monitor in the CPE and communications channels | | | | | ? | I | RA | C | I |
| Configure the flows for CPE.. | | | | | ? | CI | RA | I | - |
| Configure the Netflow platform to monitor the new customer. | | | | | ? | - | - | - | - |
| Advise the operations engineers when the new customer starts operating | | | | | ? | RA C | I | I | I |
| Let the customer know when the project is finished and when the service begins the operations stage | | | | | ? | RA C | I | I | I |
| Create the business case for the new customer | | | | | ? | RA C | I | I | I |
| Research and describe the customer's network topology. | | | | | ? | I | RA C | I | I |
| Take part in meetings/phone conferences to configure the monitoring of third party channels purchased by the customer | | | | | ? | I | RA C | - | I |
| Monitoring tests with others carriers. | | | | | ? | I | RA C | - | - |
| Consulting meetings with Network Management customers. | | | | | ? | RA C | A | I | - |

XL

| | | | | | |
|---|---|---|---|---|---|
| Create the consulting schedule for the Network Management customers | ? | RA C | I | I | - |
| Agree on preventive maintenance plans and do tests with the customers. | ? | C | RA | - | I |
| Create procedures for the Network Management Department | ? | I | I | RA C | I |
| Choose tools for the Network Management department | ? | I | I | RA C | I |
| Carry out maintenance for Network Management tools | | I | I | RA C | I |

**Table 18  New RACI matrix (Florian, 2013)**