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Master Thesis

**PERSPECTIVES OF STAKEHOLDER
ENGAGEMENT IN PROJECT
REQUIREMENTS, PLANNING AND
CONTROL**

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ABSTRACT

A requirement is a capability to which a product or service should conform to. Ambiguous and unrealistic requirements are major source of failure in most projects. Requirements management is a continuous process throughout the project lifecycle and relates to documenting, analyzing, tracing and prioritizing requirements and then finally controlling changes. Requirements are actually customer's statements of scope. This diploma thesis provides proven techniques to collaboratively develop project requirements. We will look at challenges encountered with gathering requirements, such as making sure everyone shares a common vision. Then we will explore standards available from around the globe to help establish a framework for our project elicitation process. Proactive and transparent communication especially early in the process, is critical to help stakeholders understand the project's goals and objectives. So in requirements finalization process, the stakeholders play an important role. Ways to effectively identify, engage and manage project stakeholders are also covered in this diploma thesis. We will begin by exploring the big picture and looking at the business need for stakeholder management. Then we will review success factors in project management and how stakeholder management fits in. Next a review of strategies to identify stakeholders is extensively analyzed. Then we will explain how proper stakeholder mapping in combination with management and interpersonal skills leads to successful engagement in order to break down the ideas, needs and requirements of stakeholders into smaller pieces that can come together to create the big picture. Tips, checklists and some examples linked to a shutdown project case study are given so we have some practical examples and templates. Running a successful project depends on identifying, engaging and managing all of our project stakeholders.

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CHAPTER 1: INTRODUCTION

1.1 ADDRESSING THE PROBLEM

Although the unanticipated “acts of God” doom some projects, according to the 80/20 rule the leading culprits will always include scope creep, undefined objectives and goals, poor communication, lack of stakeholder involvement and inadequate organizational support. And all of these problems share something in common: they involve or impact requirements — the process of identifying, defining, documenting and managing the solution a successful project must deliver.

The *Pulse of the Profession*® In-Depth Report of PMI about Requirements Management addresses that void. Based on a comprehensive survey of more than 2,000 practitioners, this report provides a timely and unprecedented look into the current practice of requirements management and its impact on projects and programs.

In order to better understand more about the critical competency of defining and managing requirements in organizations, and how that capability contributes to project and program success we should hear what stakeholders have to say about the problem. Stakeholders claim that there is sometimes confusion between business analysis and requirements management. It is important for organizations in order to deliver projects successfully to be really good at business analysis. And to be really good at business analysis, they should have expertise in managing requirements.

This stakeholders’ confusion is better reflected on the inability of the organizations to define the roles of Project Manager and Business Analyst. The purposes of the Business Analyst are to help the business understand its needs and to specify the requirements that will lead to the optimal solution to deliver the intended results. On the other hand, the purpose of the Project Manager is to ensure that the work of the project gets done and that this work contributes to achieving the intended results.

In fact it's really difficult to build a solution if you don't know the requirements. The "requirements gathering" step is where the requirements are first gathered from the client. “Gathering” though is not the proper word to describe this process, as requirements are not just lying around on the ground waiting to be picked up. The word "elicit" more closely matches the job, because it connotes a more active role for both the business analyst and for those with whom he works.

Elicitation is synonym to Socratic “maieutics”, which is disciplined questioning that can be used to pursue thought in many directions and for many purposes, including: to explore complex ideas, to get to the truth of things, to open up issues and problems, to uncover assumptions, to analyze concepts, to distinguish what we know from what we don't know, to follow out logical implications of thought or to control the discussion. Socratic questioning is systematic, disciplined and deep and usually focuses on fundamental concepts, principles, theories, issues or problems. Like this should be the techniques used to elicit requirements from stakeholders. And in many cases, we will

need multiple techniques to gain a complete picture from a diverse set of clients and stakeholders.

Nowadays, despite the efforts of talented, hard-working teams, organizations continue to struggle to bring consistency to their projects and programs. And in an increasingly complex business environment, with rapid technological change and globalization, project execution is only becoming more challenging. The in-depth study finds that when projects do not meet their original goals and business objectives, inaccurate requirements management is the primary cause of that outcome almost half of the time (47 percent) [PMI *Pulse*, 2014].

By comparison, in high-performing organizations, only 11 percent of projects don't meet their original goals primarily due to poor requirements management, and the waste is a much more bearable 1 percent. Taking the successful organizations as an example the low performing ones can mitigate the negative impact that poor requirements management has on projects and programs, and the financial waste that result.

First of all, organizations must get the necessary resources in place to perform requirements management for projects and programs properly, and recognize and develop the employee skills needed for effective management of requirements. In addition to this the organization's requirements management processes must be standardized, formalized and matured, and good requirements management practices should be consistently applied. Finally must be taken for granted that the organization, as a whole, top management and executive/project sponsors, fully value requirements management as a critical competency for projects and programs, and put the appropriate commitment behind it.

The organization's focus on people, processes and culture can significantly help to ensure requirements management is employed as a core competency for project and program success. In order for this to happen stakeholders must play a central role in setting up priorities and objectives of the project in order to ensure relevance and appropriateness. It is important that all stakeholders are involved in the development of projects and not just direct beneficiaries of an initiative.

Stakeholder needs and requirements represent the views of those at the business or enterprise operations level - that is, of users, acquirers, customers, and other stakeholders as they relate to the problem (or opportunity), as a set of requirements for a solution that can provide the services needed by the stakeholders in a defined environment. Using project life cycle concepts, stakeholders are led through a structured process to elicit stakeholder needs. Stakeholder needs are transformed into a defined set of Stakeholder Requirements, which may be documented in the form of a model, a document containing textual requirement statements or both.

Consequently we realize that requirements elicitation, although it is not included in project management's knowledge areas, is maybe the most important process of the ones taking place at the initial stages of building a project. It is the moment in which analysts elicit, understand and validate the requirements of a system from stakeholders. The advancement of technology has introduced many requirements gathering techniques and thus analysts are provided with various possible options. This diploma thesis will try to introduce how someone can elicit a set of clear and

concise needs related to a new or changed mission for an enterprise through proper stakeholder engagement, and transform stakeholder needs into verifiable stakeholder requirements.

1.2 PROJECT MANAGEMENT AND INITIATION PHASE

A *project* is a temporary endeavor undertaken to create a unique product, service, or result. Projects involve change – the creation of something new or different – and they have a beginning and an ending, but the outcome of the project may be ongoing. 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. A project may also be terminated if the client (customer, sponsor, or champion) wishes to terminate it. Temporary does not necessarily mean the duration of the project is short. It refers to the project’s engagement and its longevity [PMBOK Guide, 2013].

Projects consist of activities, which have interrelationships among one another, produce quality-approved deliverables, and involve multiple resources. Projects are not synonymous with products. During the life cycle of any product, the concept of project management is used, whereas, at other times, product or operations management is appropriate. The way projects are managed is determined by which of the competing project constraints is the driving factor.

Project Management is a discipline that requires discipline. The word *discipline* has the following two definitions: (1) the rules used to maintain control; and (2) a branch of learning supported by mental, moral, or physical training. Project management, therefore, is a discipline (definition 2) that requires discipline (definition 1). It is a branch of learning that deals with the planning, monitoring, and controlling of one-time endeavors [Dinsmore & Cabanis-Brewn, 2014].

In other words project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through 47 processes, logically grouped in 5 Process Groups as shown in figure 1.1:

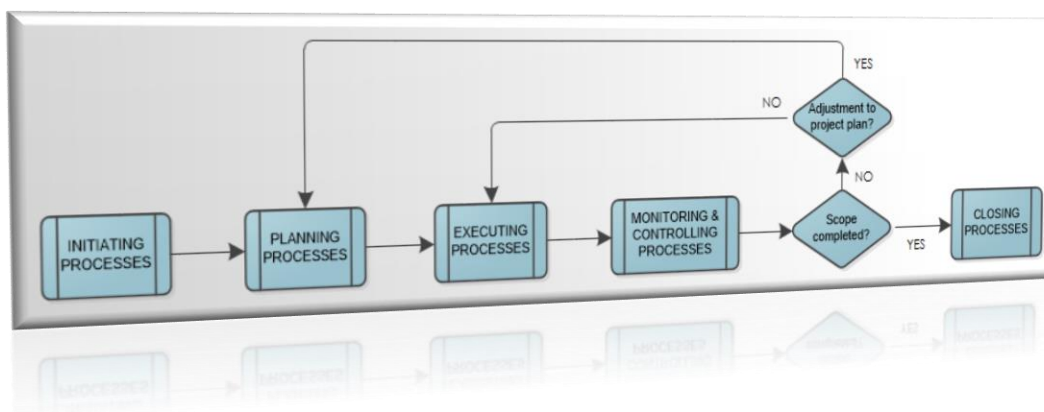


Figure 1.1: Project Management Process Groups

Managing a project typically includes, but is not limited to:

- Identification of all requirements;
- Addressing the various needs, concerns, and expectations of the stakeholders throughout the planning and execution of the project;
- Communicating with and managing stakeholders;
- Managing the competing project constraints such as: Scope, Quality, Schedule, Budget, Resources, Risks ... [PMBOK Guide, 2013].

The *Project Manager* is the person assigned by the performing organization to lead the team that is responsible for coordinating and integrating activities across multiple, functional lines in order to achieve the project objectives [PMBOK Guide, 2013]. The project manager's challenge is to combine the art of project management which includes interpersonal and general management skills such as leadership, decision making, flexibility, managing change and expectations, mentoring and consulting with the science of project management which comprises of tangible elements such as Gantt charts, controls variance analysis, risk management, status reporting, resource estimating and leveling.

In many organizations, employees have little incentive to assume the position of project manager, largely because organizations have historically assumed that technical capabilities of individuals could be translated into project management expertise. Assuming that the project and functional managers are not the same person, we can identify a specific role for the *functional manager*. There are three elements to this role [Kerzner, 2009]:

The functional manager has the responsibility to define *how* the task will be done and *where* the task will be done (i.e., the technical criteria). The functional manager has the responsibility to provide sufficient resources to accomplish the objective within the project's constraints (i.e., *who* will get the job done). The functional manager has the responsibility for the deliverable.

The *Project Management Office (PMO)* is an organizational structure that standardizes the project related governance processes and facilitates the sharing of resources, methodologies, tools and techniques [PMBOK Guide, 2013]. Modern project management places its focus on leadership and communication rather than a narrow set of technical tools, and advocates the use of the project management office in order to change corporate culture in a more project-oriented direction.

Project management process groups are a logical way to categorize and implement the knowledge areas. The fifth edition of the *PMBOK® Guide* recommends addressing every process group for every project. However, the tailoring and rigor applied to implementing each process group are based on the complexity of, and risk for, the specific project. The project manager uses the process groups to address the interactions and required trade-offs among specified product requirements to achieve the project's final product objective. Project managers iteratively perform the activities within the process groups on their projects as shown in figure 1.2, which illustrates how the output of one process group provides one or more inputs for another process group, or even how an output may be the key deliverable for the overall project.

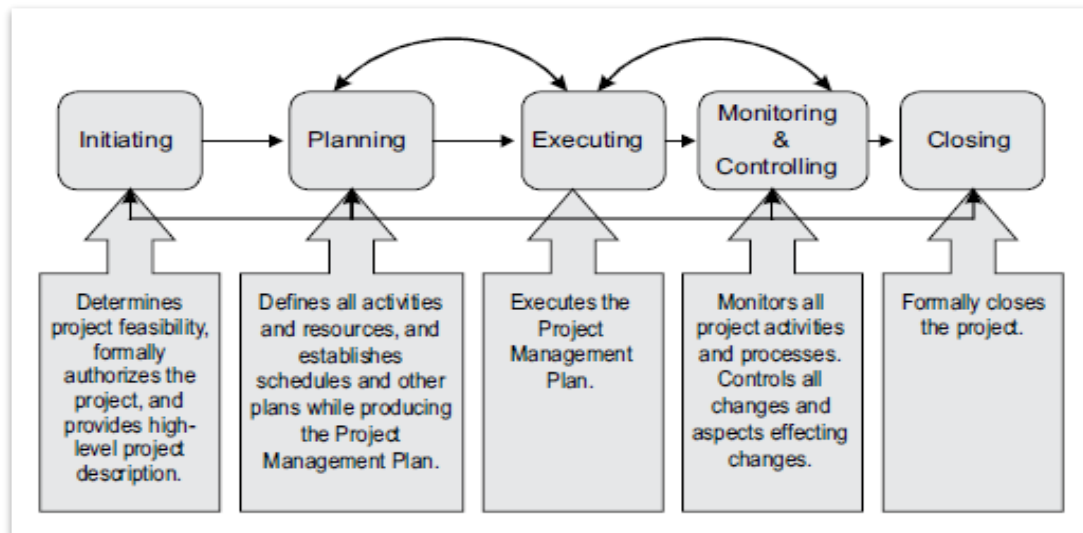


Figure 1.2: Project Management Process Groups' interactions.

In this diploma thesis most of the concepts described take place at the first two process groups of project management. The *Initiating Process Group* is the phase where we define our project and obtain authorization to complete our goals. Similar to how a referee starts a match with the blow of his whistle, a project or a new phase of project needs some authorization to start it. The Initiating Process Group defined in the Project Management Body of Knowledge (PMBOK) 5th Edition provides critical activities that need to be performed before we plan and execute the project [PMBOK Guide, 2013].

Now, let's get into the process group and understand what this one sentence definition entails. While traditional project management focuses on "on time, in budget, to scope" execution and delivery, the MoP [Morris, 1994] also focuses on the project in its context, particularly on early definition of the conditions for stakeholder success. In order to define a new project, the implementation of two knowledge areas is starting to take place: Integration Management through the development of a project charter and Stakeholder Management through the identification of stakeholders.

Project Integration Management is one of the nine knowledge areas defined by [PMBOK Guide, 2013] and is concerned with managing the integration aspects of the project through the Project Management Plan and its subsidiary plans. In practice, there is no clear definition of how to integrate project processes, activities, and knowledge. The project manager's role is made both challenging and rewarding by the skill gained while managing the project to facilitate and monitor efforts for success.

Develop Project Charter is the process of developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities. The key benefit of this process is a well-defined project start and project boundaries, creation of a formal record of the project, and a direct way for senior management to formally accept and commit to the project.

Stakeholder management includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project. The newest knowledge area in the standards, its addition reflects the growing realization that

project management relies on people—not just the project manager and team, but also the executives, managers, clients or customers, vendors, partners, end-users, and communities that have a stake in the project’s outcome. Identifying and analyzing the needs and roles of stakeholders is a critical basis for planning, risk management, and requirements gathering [PMBOK Guide, 2013].

"Stakeholder management is critical to the success of every project in every organization I have ever worked with. By engaging the right people in the right way in your project, you can make a big difference to its success... and to your career" [Thompson].

As we become more successful in our career, the actions we take and the projects we run will affect more and more people. The more people we affect, the more likely it is that our actions will impact people who have power and influence over our projects. These people could be strong supporters of our work – or they could block it [Thompson].

Stakeholder is any individual, group, organization or entity who may affect, be affected by, or perceive itself to be affected by a decision, activity or outcome of a project. A stakeholder is anyone who has a "stake in the ground" and cares about the effort sponsoring the change, supplying, or executing it.

Stakeholder Management is an important discipline that successful people use to win support from others. It helps them ensure that their projects succeed where others fail. *Stakeholder Analysis* is the technique used to identify the key people who have to be won over. Stakeholder Analysis involves systematic gathering of qualitative and quantitative information of stakeholders’ expectations, needs and desires to identify their influence on the project. The objective is to identify stakeholder relationships that can be leveraged to increase possibility of project success. Stakeholder analysis generally follows a three-step process – identify stakeholders, identify potential impact, and assess stakeholders’ likely reaction to given situations.

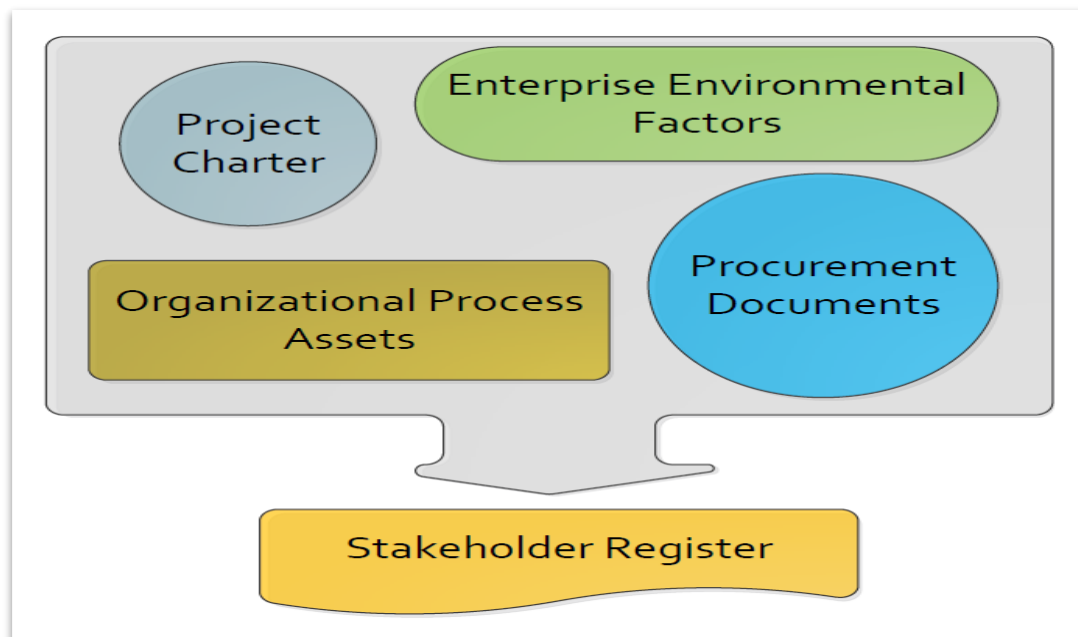


Figure 1.3: Identify Stakeholders: Inputs and Outputs

Stakeholder register is a list of all the project stakeholders and contains all relevant details of the stakeholders as per project needs. The information generally contains contact information, role details, expectation from project, type of influence etc...

1.3 THE PLANNING PHASE AND OTHER TERMS

The *Planning Process Group* consists of those processes performed to establish the total scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives. The Planning processes develop the project management plan and the project documents that will be used to carry out the project. The complex nature of project management may require the use of repeated feedback loops for additional analysis. As more project information or characteristics are gathered and understood, additional planning will likely be required. Significant changes occurring throughout the project life cycle trigger a need to revisit one or more of the planning processes and, possibly, some of the initiating processes. This progressive detailing of the project management plan is called *progressive elaboration*, indicating that planning and documentation are iterative and ongoing activities. The key benefit of this Process Group is to delineate the strategy and tactics as well as the course of action or a path to successfully complete the project or phase. When the Planning Process Group is well managed, it is much easier to get stakeholder buy-in and engagement. These processes describe how this will be done, resulting in the desired objectives [PMBOK Guide, 2013].

Setting scope is one of the first project management processes completed during the planning phase as it defines outcomes and deliverables. It is part of creating a vision for the team and stakeholders alike. *Project Scope Management* includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It defines and controls what is included in the project and what is not.

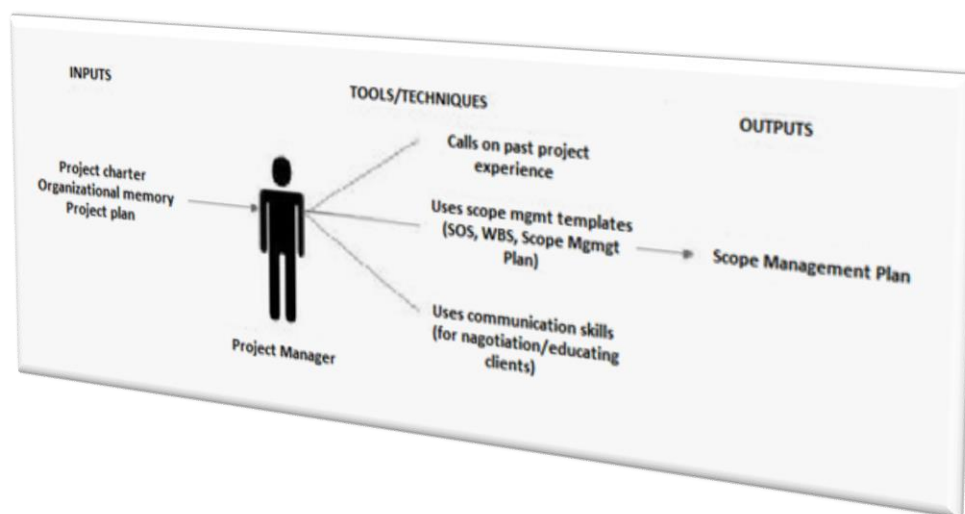


Figure 1.4: Plan Scope Management

Plan Scope Management is the process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled. The key benefit of this process is that it provides guidance and direction on how scope will be established and maintained, and how the Work Breakdown Structure (WBS) will be developed.

Collect Requirements is the process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives. The key benefit of this process is that it provides the basis for defining and managing the project scope including product scope.

Requirements management is the process of documenting, analyzing, tracing, prioritizing, agreeing on requirements and then controlling change and communicating to relevant stakeholders. It is a continuous process throughout a project. A requirement is a feature, specification, capability or constraint your product must have on delivery to the customer [Gergel].

Requirements management process administers changes to the agreed requirements, relationships between requirements and dependences between the requirements document as well as other documents produced during the entire system and software engineering process [Kotonya & Sommerville, 1998].

The foundation of this process is the *project charter* and *stakeholder register*. From these, the team can identify requirements, collectively discuss details associated with meeting each requirement, conduct interviews and follow-on discussion to clarify the requirements, and document the requirements in sufficient detail to measure them once the project begins the execution phase. This documentation also serves as an input to the next step in the process which is to define scope.

Scope defines the product, service, outcome or result of a project. Project scope is the work that must be performed to achieve the project objectives as defined in the project charter. Product scope refers to functional and nonfunctional characteristics of a product, result or service.

The *scope definition* section details the process of developing a detailed description of the project and its deliverables. This can only be completed after the requirements have been identified and defined during the requirements definition process. During the requirements definition process three documents were created; Requirements Documentation, Requirements Management Plan and a Requirements Traceability Matrix. You can refer to these documents when defining the projects' scope.

Requirements management plan, a subsidiary of the project management plan describes how requirements will be prioritized, managed, controlled and details the management and approval procedure for changes to the scope baseline. It also details the traceability structure – requirement attributes to be captured on traceability matrix and the relationship with other project documents to trace the requirement.

The *requirements traceability matrix* is a grid that links product requirements from their origin to the deliverables that satisfy them. The implementation of a requirements traceability matrix helps ensure that each requirement adds business value by linking it to the business and project objectives. It provides a means to track requirements throughout the project life cycle, helping to ensure that requirements approved in the

requirements documentation are delivered at the end of the project. Finally, it provides a structure for managing changes to the product scope.

Project scope statement documents the project requirements, scope description, objectives, deliverables, project boundaries, constraints, acceptance criteria, assumptions and milestones and provides a common understanding of the project scope among project stakeholders as basis for future project decisions.

Create WBS is the process of subdividing project deliverables and project work into smaller, more manageable components. The key benefit of this process is that it provides a structured vision of what has to be delivered.

The *scope baseline* is the approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary, that can be changed only through formal change control procedures and is used as a basis for comparison. It is a component of the project management plan.

Requirements may include technical requirements, facilities requirements, data requirements, management requirements, or special instructions. Technical requirements may include codes, standards, laws, engineering or design specifications, models, or examples of the mandatory or recommended compliance of the project. When there are mandatory requirements, such as laws, these must be identified and listed, or the project staff runs the risk of noncompliance and legal prosecution.

Facilities requirements include an initial assessment of types, amount, and quality of facilities needed for the project, along with related utilities, furniture, and equipment. This provides initial bases for estimating quantities and costs associated with those resources. Overlooking facilities issues during project planning leads to schedule slippages, cost overruns, unhappy project participants, and untold headaches for the project managers. For small projects, facility requirements may not be a big issue; for larger projects, they can be critical.

Functional and operational requirements (F&ORs) spell out what the system, facility, or product being produced is intended to do. Where F&ORs exist, listing or identifying them greatly simplifies and facilitates the design process. Mandatory data requirements, management directives, or special instructions are also identified and documented during the planning process. Requirements are often defined or captured in other documents, which are then referenced in the PM plan.

In software projects the terms requirements development and requirements engineering are often used. *Requirements development* is the process of defining a project's scope, identifying user classes and user representatives, and eliciting, analyzing, specifying, and validating requirements. The product of requirements development is a set of documented requirements that defines some portion of the product to be built [Wiegiers & Beatty, 2013].

Requirements engineering is the sub discipline of systems engineering and software engineering that encompasses all project activities associated with understanding a product's necessary capabilities and attributes. Includes both requirements development and requirements management [Wiegiers & Beatty, 2013].

Quality management is a knowledge area that is inextricably associated with requirements management. It includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. Quality management makes use of quality planning, quality assurance, quality control, and quality improvement techniques and tools. If the requirements for the product of the project are consistent with the real, or perceived, needs of the customers, then the customers are likely to be satisfied with the product of the project. The product either conforms to these requirements or it does not. If the product going to the customers has no defects, they can perform their task in the most efficient manner—and do the right thing right the first time.

Plan Quality Management is the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will demonstrate compliance with relevant quality requirements. The key benefit of this process is that it provides guidance and direction on how quality will be managed and validated throughout the project.

Plan Stakeholder Management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success. The key benefit of this process is that it provides a clear, actionable plan to interact with project stakeholders to support the project's interests.

The *Monitoring and Controlling Process Group* consists of those processes required to track, review, and orchestrate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes. The key benefit of this Process Group is that project performance is measured and analyzed at regular intervals, appropriate events or exception conditions to identify variances from the project management plan.

Validate Scope is the process of formalizing acceptance of the completed project deliverables. The key benefit of this process is that it brings objectivity to the acceptance process and increases the chance of final product, service, or result acceptance by validating each deliverable.

Control Scope is the process of monitoring the status of the project and product scope and managing changes to the scope baseline. The key benefit of this process is that it allows the scope baseline to be maintained throughout the project.

Control Quality is the process which is part of the Project Quality Management knowledge area. Since the key focus area of this process is to ensure the deliverables are as per the quality requirements defined, the Control Quality process typically takes place before the Validate Scope process. The key outputs of the Control Quality process are:

- Quality control measurements
- Validated changes and verified deliverables
- Work performance information and change requests.

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CHAPTER 2: HISTORICAL BACKGROUND OF STAKEHOLDER THEORY

2.1 THE BIRTH OF THE IDEA

The term stakeholder emerged in 1963 from a ground breaking memorandum at the Stanford Research Institute, which argued that managers “needed to understand the concerns of shareholders, employees, lenders and suppliers, in order to develop objectives that stakeholders could support” [Sinclair, 2010]. It was a topic of discussion more than thirty years before it was defined, and has since been the subject of hundreds of articles, books, and corporate research studies. It is a topic now taught in management classes in college, a term used in business to include any group of people with an interest in the company, and has developed into a management strategy for corporate performance goals. This introduced a novel view on organizations’ purpose, which opposed the prevalent neoclassical understanding of business, which argued that solely stockholders need to be considered by managers when making decisions [Parmar et al., 2010].

Subsequently, R. E. Freeman was the first to apply the term to strategic management and detail the idea of stakeholder theory and according management in his 1984-publication “Strategic Management: A Stakeholder Approach” [Sinclair, 2010; Parmar et al., 2010; Donaldson & Preston, 1995; Laplume et al., 2008]. According to Freeman et al. [2010] stakeholder theory was designed to solve three problems which had arisen throughout the last decades, and aims at improving our understanding of value creation and how it is traded, connecting ethics and capitalism, and help managers deal with these matters [Freeman et al., 2010; Parmar et al., 2010]. It addresses the problem of value creation and trade, the problem of ethics of capitalism, and the problem of managerial mindset [Parmar et al., 2010].

Stakeholder theory was hence introduced as an approach towards strategic management, and can nowadays be found in an enormous amount of managerial publications and articles dealing with project success, strategic frameworks, project environment, and the social aspects of project management. Within these areas of project management research, project stakeholders are often mentioned as essential players in projects [Cleland, 1986; Miller & Olleros, 2001; Office of Government Commerce, 2003; Olander & Landin, 2005]. Cleland [1986] introduced stakeholders and stake-holder management processes to the project management canon by highlighting the importance of stakeholder identification, classification, analysis, and management approach formulation. During the last few years, many authors stated clearly the extraordinary importance of stakeholders in projects [Burgoyne, 1999; Dervitsiotis, 2003; Freeman, 2002; Jergeas, Williamson, Skulmoski, & Thomas, 2000]. Stakeholder management has become an important soft skill in projects [Crawford, 2005; Morris, Jamieson, & Shepherd, 2006; Winter, Smith, Morris, & Cicmil, 2006].

Stakeholder theory has its origins in the year 1984. At that time, Freeman defined stakeholders as “any group or individual who can affect or is affected by the achievement of the organization’s objectives” [Freeman, 1984]. Freeman's definition is often cited as the classic stakeholder definition [Achterkamp & Vos, 2008; Boonstra, 2006]. Although this term had been used before, Freeman's use of it was the starting point of stakeholder theory [Achterkamp & Vos, 2008].

Making a brief literature review for the stakeholder theory approach, we will find that it is well spread over the most important project management journals, over many industry sectors, and also over many countries. By analyzing the cited definitions and their qualitative developments over time, we conclude that the understanding of the term *stakeholder* is moving toward a more comprehensive and multilateral view. Stakeholders are considered as more important in the context of project management and therefore the stakeholder theory development comes mostly from articles related to the context of project evaluation and project strategy.

2.2 DEFINITION OF THE TERM “STAKEHOLDER”

Trying to find out whether and how the stakeholders are defined throughout history we took a look into the analysis made by Paul Littau and Gerald Adlbrecht in their article “25 years of stakeholder theory in project management literature (1984-2009)”. Among 116 articles included in this research, 28 articles mentioned a definition for *stakeholder* in their articles, which represents 24% of the total stakeholder articles. Among 28 definitions, 22 were unique definitions, either defined by the author himself or by some other author. Their main aim was to see which definitions appeared in these 116 articles, who sourced these definitions to stakeholder theory and when, and whether there is any evolution in the total spectrum of these definitions from 1984 to 2009.

In these varieties of definitions, there were only two main different types of definitions; one is stated by Freeman [1984]: “... a stakeholder in an organization is any group or individual who can affect or is affected by the achievement of the organization’s objectives...”; another is by Cleland [1985]: “...who have a vested interest in the outcome of the project.” The remaining definitions are either minor modifications of these two definitions or a combination of the two. For example, the definition by Dinsmore [1990], “who has a stake in project outcome,” is almost similar to Cleland's vested interest definition. Consider another example definition by Andersen [2005]: “... a person or a group of persons, who are influenced by or able to influence the project.” This definition is similar to Freeman's “can affect and affected by” definition. From this observation, they defined two groups of definitions: one is the “interest-in” or “stake-in” definition group, and another one is the “can affect or affected by” definition group, with the synonyms for “can affect and affected by” being “able to influence or are influenced by,” “impacted by,” and so on. And there is a third group of definitions that are a combination of these two definitions. For example, Boddy and Paton [2004] stated, “Stakeholders are individuals, groups or institutions with an interest in the project, and who can affect the outcome.” In this definition, we can find both the key terms *interest-in* and *can affect*, so this definition falls into the third category of definitions.

The evolution of the stakeholder definition started in 1984 with Freeman’s [1984] well-known “can affect and affected by” definition (Figure 2.1). Immediately thereafter in 1985, Cleland [1985] gave his well-known “interest-in” definition. Considering the evolution of stakeholder definition, they found that since Cleland’s “interest-in” definition gained momentum and appeared frequently from 1986 to 2007; on the other hand, from 1985 to 2001 there was no “can affect and affected by” definition. Even though the combination definition appeared first in 1996 in the PMBOK Guide, there were no definitions of this kind from 1997 to 2003. The combination definition appeared again in 2004 and, since then, it has appeared in 2006, 2008, and 2009. The important conclusion we can draw here is that we can divide the 25 years of stakeholder approach into two eras, before 2002 and after 2002 (Figure 2.1). The era before 2002 is dominated by the “interest-in” definition, and the era after 2002 is dominated by the “can affect and affected by” and combination definitions. Nevertheless, the “interest-in” definition has its significance over the complete range of 25 years [Littau & Adlbrecht, 2010].

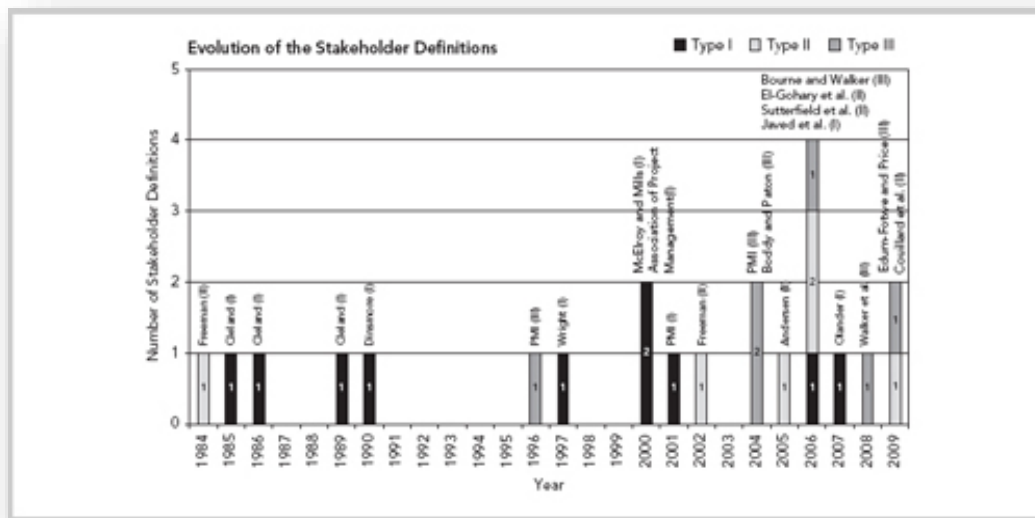


Figure 2.1: Evolution of the stakeholder definitions [Littau & Adlbrecht, 2010].

According to Laplume, Sonpar & Litz’s [2008] analysis of the extant literature stakeholder theory has gone through three major periods (see Table 2.A). Period 1, which they term *incubation*, lasted from 1984 until 1991. During this period, the emerging stakeholder literature was largely confined to conference proceedings, dissertations, practitioner journals, and book chapters, as evidenced by Wood’s [1991] review of the then-existing literature and list of citations regarding stakeholder theory. Period 2, 1991 to 1998, which they term *incremental growth*, boosted the theory’s development. This period witnessed the publication of several seminal works in leading academic management journals. For instance, stakeholder theory was featured in a special issue of Academy of Management Review in 1995 that included Donaldson and Preston’s [1995] article, which distinguished among three branches of stakeholder theory: the descriptive (how firms behave), the normative (how firms should behave), and the instrumental (how behavior affects performance). And finally period 3, which they term *maturity*, started around 1999 and continues to the present. This period saw a significant increase in attention to the theory, especially in social issues in

management circles, prompting remarks such as “it is not too farfetched to say that stakeholder theory has swept the field in some sense” [Buchholz & Rosenthal, 2004].

Adding the year of publication to the articles, described by their qualitative level of contribution to stakeholder theory, in most of the articles published between 2006 to 2009 stakeholder theory is discussed and developed further or enriched by new models or concept. Although the beginning of stakeholder theory was in 1984 and many articles were published before 2006, these articles simply mention the word *stakeholder* without any explanation or deeper meaning to stakeholder theory or just apply this theory to any topic of project management. Obviously, the application of terminology and theory in those earlier years required a further development of stakeholder theory, which took place as a consequence after 2006.

Year	Theme											
	Definition and Saliency		Firm Actions and Response		Stakeholder Actions and Response		Firm Performance		Theory Debates		Total	
	T	E	T	E	T	E	T	E	T	E	T	E
Period 2												
1991 to 1994	1	1	2	3	0	0	1	2	6	0	10	6
1995 to 1998	3	3	4	6	0	1	1	3	8	2	16	15
Period 3												
1999 to 2002	6	6	10	8	4	3	3	7	17	2	40	26
2003 to 2007	9	3	11	11	5	9	5	6	19	1	49	30
Total	19	13	27	28	9	13	10	18	50	5	115	77

Note: T = theoretical; E = empirical. Some articles include more than one theme. Period 1 was excluded for lack of articles.

Table 2.A: Theme Frequencies by Period—Theoretical and Empirical Articles [Laplume, Sonpar & Litz's, 2008]

2.3 STAKEHOLDER THEORY IN PROJECT MANAGEMENT LITERATURE

Many articles are dedicated to the field of project success—for instance, researching success criteria—as well as to the fields of project risk and project performance. We put these together in the category of the project evaluation context, as they are evaluating projects by success, risk, and performance. Other articles describe the influence of stakeholder theory on project strategy, containing information about project management concepts, different strategic frameworks, and also business processes in projects. There is also a considerable amount of articles describing the interaction between stakeholder management and project social context focusing on topics such as trust, communication, and leadership in projects. Last but not least we can find articles based on the project environment context, discussing the roles of clients, sponsors, users, and the like, as well as concentrating on other external factors in projects.

The vast majority of the stakeholder articles are in the context of project evaluation or project strategy that is to say that the body of stakeholder literature in PM is fed predominantly by these research fields—without saying anything about the quality of contributions. In contrast, we can conclude that stakeholders are considered as an important factor in the project evaluation and project strategy contexts. Articles with project social and project environment contexts contribute almost one-third of the stakeholder literature in the analyzed framework, meaning that stakeholder importance is also considered in these two fields.

One typical example is the Standish Group CHAOS Report which provides success, failure and challenge rates for IT projects for many years. While the report happens to focus on IT projects, the study can provide insight on all types of projects. The report will list those things that if present will lead to success and if absent or challenged can lead to project failure. The most recent research report showed the top ten as executive support, user involvement, clear business objectives, emotional maturity, optimizing scope, agile process, project management expertise, skilled resources, execution and tools and infrastructure. Little has changed to the top of the list over the years.

Executive support and user involvement were noted all the way back in the reports of 1994 as two main success factors when present and failure points when absent. And they remain the top two issues today. Our executives and our users represent key stakeholders in any project. So it's not an exaggeration to say that stakeholders are critical to successful management of any project they fairly occupy a large proportion of PM literature.

2.4 STRATEGY AND ORGANIZATION LITERATURE REVIEW

By the 1970s the stakeholder concept began to surface in a number of places in the strategic planning literature. In a review article on the state of the art of corporate strategy, [Bernard Taylor \[1971\]](#) claimed that the importance of stockholders would diminish. He thought that business would eventually be run for the benefit of stakeholders [[Taylor, 1971](#)]. [Derkinderen and Crum \[1979\]](#) used the stakeholder notion in their analysis of project set strategies, and the idea plays a central role in [Heenan and Perlmutter's](#) analysis of organization development for multinational corporations [[1979](#)]. Specific applications of the concept in managerial processes in the strategic planning literature include [Davis and Freeman's \[1978\]](#) method for technology assessment and [Mitroff and Emshoff's \[1979\]](#) method for strategy formulation called "strategic assumptions analysis. This line of inquiry suggested that managers often held divergent assumptions about their stakeholders, and suggested that deliberate analysis of a broad group of stakeholders could improve organizational decision making.

Several articles in the early 1980s recognized the increasing complexity of modern corporations, the increasing intensity of stakeholder claims on those organizations, and the usefulness of stakeholder-oriented planning processes in dealing with these issues

[Armstrong, 1982; Carroll, 1983; Charan and Freeman, 1980; Fombrun and Astley, 1983; MacMillan, 1982, 1983; Mendelow, 1983; Ruffat, 1983]. In addition, Mahon and Murray [1981] applied stakeholder theory to strategic planning in regulated companies. They argued that managers in those companies should expend considerable resources in wooing their external stakeholders. They also suggested that strategies based on the integration of economic, political, and social goals are more likely to be successful.

Margolis and Walsh [2003] argue that because stakeholder theory incites disagreements over deeply rooted values, its proponents and detractors are unlikely to converge. Despite its fair share of detractors, we believe that the rise in prominence of stakeholder theory has occurred largely because it is a theory that moves people by virtue of its emotional resonance [Weick, 1999]. For instance, although proponents such as Freeman point to the "emergence of concerns with 'vision and values,' and 'a sense of purpose' in the mainstream conversations about business" [Freeman, 2000] even detractors, such as Jensen, acknowledge that "stakeholder theory taps into the deep emotional commitment of most individuals to the family and tribe" [Jensen, 2002].

Since 1999 there has been a significant increase in attention to the theory, especially in social issues in management circles, prompting remarks such as "it is not too farfetched to say that stakeholder theory has swept the field in some sense" [Buchholz & Rosenthal, 2004]. The extensive literature produced during this period prompted three review articles. For instance, Stoney and Winstanley [2001] reviewed stakeholder theory as described in U.K.-based practitioner journals, examining ideological, implementation, and competitiveness issues. Also, Walsh reviewed three prominent books on stakeholder theory, concluding that it provides very little "counsel to our business leaders when they are asked to make [social] investments" [Walsh, 2004].

Finally, Kaler [2003, 2006] conducted an on-going multi-installment review of *normative* stakeholder theories "directed at understanding and assessing stakeholder theory for the purposes of business ethics" [Kaler, 2006].

2.5 THE CLIMAX OF STAKEHOLDER THEORY

This added stress on Stakeholder Management is so important because effectively managing stakeholders is one of the hardest tasks in a project. This is because projects cause change, and people need to be prepared for those changes in order to accept them. The more we can involve stakeholders in a way that facilitates change and enhances the project's objective -- the better.

While we may know that Stakeholder Management is important intuitively, if we don't have a concrete plan in how we will manage our stakeholders, our best intentions can fall to the wayside as other project priorities consume the team's time and energy. This is why having a Stakeholder Management Plan (an output to Plan Stakeholder Management) is so important.

Pretty much anyone walking or breathing near our project is a stakeholder. In keeping with the evolution of thinking regarding stakeholder management within projects, a new Knowledge Area was added addressing Project Stakeholder Management. Information on stakeholder identification and managing stakeholder expectations was moved from Section 10 on Project Communications Management to this new Knowledge Area in PMBOK to expand upon and increase the focus on the importance of appropriately engaging project stakeholders in the key decisions and activities associated with the project. New processes were added for Plan Stakeholders Management and Control Stakeholders Engagement. Some inputs and outputs were renamed for several processes to support consistency between the various project management processes. Inputs and outputs were adjusted for several processes to reflect the new model of project data and information flow during the execution of project work.

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CHAPTER 3: PMI STANDARD FOR STAKEHOLDER MANAGEMENT AND REQUIREMENTS GATHERING

3.1 INTRODUCTION

According to the project management content defined in chapter 1 the relationship among the factors which determine the successful outcome of a project is such that if any one factor changes, at least one other factor is likely to be affected. For example, if the schedule is shortened, often the budget needs to be increased to add additional resources to complete the same amount of work in less time. If a budget increase is not possible, the scope or targeted quality may be reduced to deliver the project's end result in less time within the same budget amount. Project stakeholders may have differing ideas as to which factors are the most important, creating an even greater challenge. Changing the project requirements or objectives may create additional risks. The project team needs to be able to assess the situation, balance the demands, and maintain proactive communication with stakeholders in order to deliver a successful project. Due to the potential for change, the development of the project management plan is an iterative activity and is progressively elaborated throughout the project's life cycle.

Very early in the life of a project, it is critical to identify all of the organizations and people who may have an impact on the project, and all those who may be impacted by it. A 'stakeholder' is any person or organization that is actively involved in a project, or whose interests may be affected positively or negatively by execution of a project.

A project manager must be sure to identify and list all potential stakeholders for a project. In addition to those on the project team potential stakeholders include:

Stakeholders may be:	Employees	Competitors	Labor unions
Government	Local Communities	Investors	Potential Employees
National Communities	Shareholders	Industry groups	Regulatory Bodies
Professional Associates	Public	Prospective Customers	Suppliers

Table 3.A: Potential stakeholders

Stakeholders can be internal to the organization or external. In many projects the public at large will become a stakeholder to be considered during the project. The challenge for the project manager when the public is a stakeholder will be to act while considering public needs. Often there is no direct representative of the public to be consulted during project planning and execution.

Stakeholder involvement should be supported by an emphasis on quality relationships in which the parties are aware of their responsibilities and communication between them is clear and comprehensive. Stakeholder-based contributions to project success include executive support and effective use of organization's infrastructure to support the project.

The project manager must document relevant information for all identified stakeholders. This information may include the stakeholder's interests, involvement, expectations, importance, influence and impact on the project's execution as well as any specific communications requirements. It is important to note that although some identified stakeholders may not actually require any communications they should be identified.

3.2 DIFFERENT MODELS OF STAKEHOLDER MANAGEMENT

We can find guidance on stakeholder management from a number of different sources or professional organizations. From the project management perspective we can look to the Project Management Body of Knowledge published by the Project Management Institute in the United States, to Project IN Controlled Environments also known as PRINCE2 created in the United Kingdom along with the commercial entity for European professional standards or agile groups and organizations with their many forms for extreme for extreme programming to scrum. They all provide opinions, processes and directions on stakeholder management.

Let's start with the guidance from PMBOK. The four main processes of stakeholder management from the PMBOK are: First to identify stakeholders, which covers identifying everyone affected by the work or its outcomes. Second is to plan stakeholder management deciding how to engage with your stakeholders and suggest capturing that in a matrix to show stakeholders' current awareness of your project and your desired level of engagement from that individual. Third process is to manage stakeholder engagement, which applies good communication methods, interpersonal skills and management strategies to manage issues or make changes as necessary. Fourth is to control stakeholder engagement which involves monitoring the overall relationship and adjusting strategies and plans needed.

From the business analysis world we can gather insight from the International Institute of Business Analysis (IIBA) and their Business Analysis Body of Knowledge [Brennan, 2009]. This group is a Canadian corporation headquartered in Ontario Canada. Their model includes six basic processes: 1. Business analysis, planning and monitoring, 2. Elicitation, 3. Requirements management and communication, 4. Enterprise analysis, 5. Requirements analysis and 6. Solution assessment and validation. There is more information available at their website at www.iiba.org.

IITL which stands for Information Technology Infrastructure Library is published by the same group at the United Kingdom as PRINCE2. They have elements attached to their life cycle such as 1. Service strategy, 2. Service design, 3. Service transition, 4.

Service operation and 5. Continual service improvement. In the IITL model stakeholder management is a crucial process in the service transition element and ultimately contributes to the success of any delivered service.

We can also find guidance on stakeholder management from the Information Systems Audit and Control Association. They publish control objectives for information and related technology, also known as COBIT (1. Stakeholder drivers, 2. Benefits realization, 3. Risk optimization, 4. Resource optimization, 5. Enterprise goals). The business orientation of COBIT consists of linking business goals to IT goals providing metrics and maturing models to reassure their achievements and identify the associated responsibilities of business and IT process owners [Harris, Herron, Iwanicki, 2008]. Their first principle is to meet stakeholder needs. In their governance model they promote negotiations to decide amongst different stakeholder values and interest. Three key questions they attempt to answer are: Who receives the benefits? Who bears the risk and what resources are required?

Once you choose or identify your existing project model be prepared to identify and engage each stage within that model to help you work with stakeholders throughout your project.

3.3 STAKEHOLDER MANAGEMENT THROUGH PMI'S PROCESS GROUPS

Stakeholder identification along with the development of the project charter are the two processes which the initiating process group consists of. Identify Stakeholders is the process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success. The key benefit of this process is that it allows the project manager to identify the appropriate focus for each stakeholder or group of stakeholders. The inputs and outputs of this process are depicted in Figure 3.1 [PMBOK Guide, 2013].

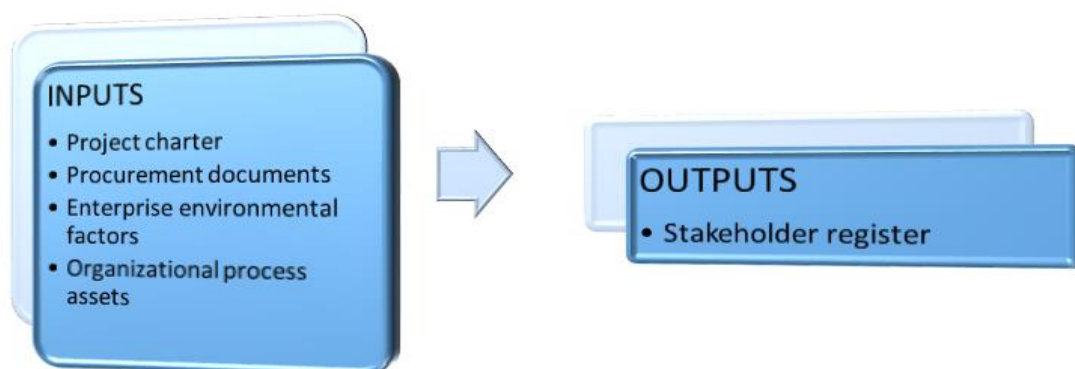


Figure 3.1: Identify Stakeholders, Inputs & Outputs [adapted from the PMBOK® 2013]

The planning basis section provides for the documentation of the total scope of the effort, key assumptions, requirements, and other factors considered during preparation of the project management plan. Preparing a project management plan is

a straightforward effort that promotes and ensures comprehensive project planning. When the Planning Process Group is well managed, it is much easier to get stakeholder buy-in and engagement. These processes describe how this will be done, resulting in the desired objectives. Plan Stakeholder Management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success. The key benefit of this process is that it provides a clear, actionable plan to interact with project stakeholders to support the project's interests. The inputs and outputs of this process are depicted in Figure 3.2 [PMBOK Guide, 2013].



Figure 3.2: Plan Stakeholder Management: Inputs & Outputs [adapted from the PMBOK® 2013]

The Executing Process Group consists of those processes performed to complete the work defined in the project management plan to satisfy the project specifications. This Process Group involves coordinating people and resources, managing stakeholder expectations, as well as integrating and performing the activities of the project in accordance with the project management plan. Manage Stakeholder Engagement is the process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle. The key benefit of this process is that it allows the project manager to increase support and minimize resistance from stakeholders, significantly increasing the chances to achieve project success. The inputs and outputs of this process are depicted in Figure 3.3 [PMBOK Guide, 2013].

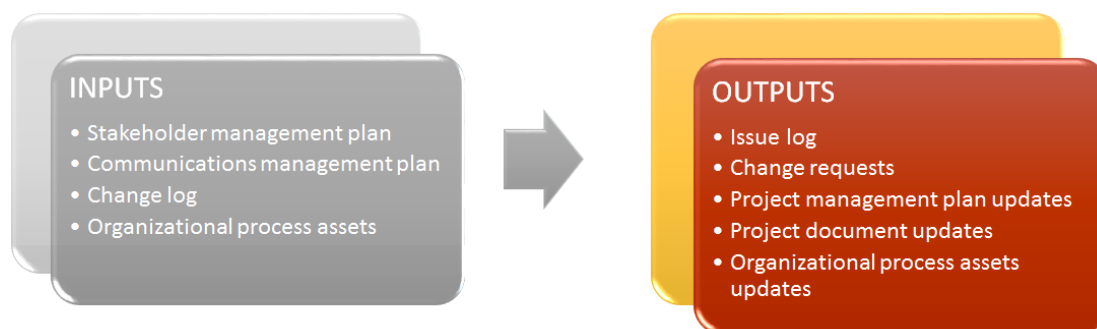


Figure 3.3: Manage Stakeholder Engagement: Inputs & Outputs [adapted from the PMBOK® 2013]

The Monitoring and Controlling Process Group consists of those processes required to track, review, and orchestrate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes. The key benefit of this Process Group is that project performance is measured and analyzed at regular intervals, appropriate events or exception conditions to identify

variances from the project management plan. During this process group we are trying to Control Stakeholder Engagement by monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders. The key benefit of this process is that it will maintain or increase the efficiency and effectiveness of stakeholder engagement activities as the project evolves and its environment changes. The inputs and outputs of this process are depicted in Figure 3.4 [PMBOK Guide, 2013].

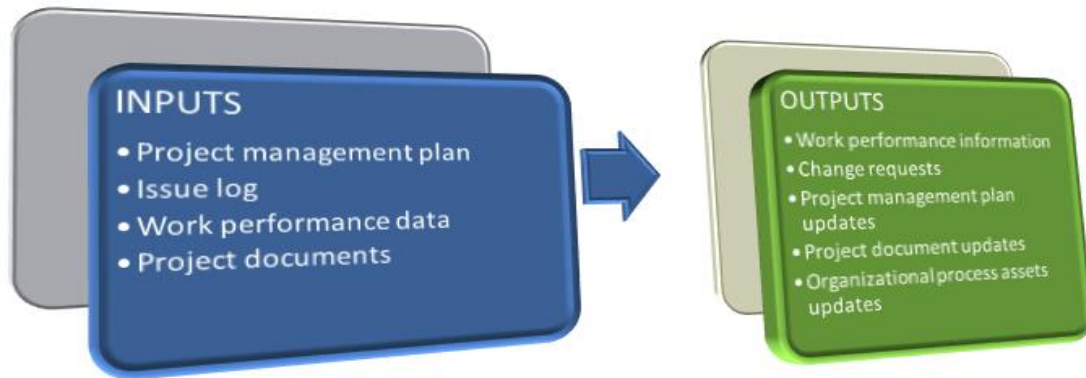


Figure 3.4: Control Stakeholder Engagement: Inputs & Outputs [adapted from the PMBOK® 2013]

3.4 COLLECT REQUIREMENTS FOR SCOPE DEFINITION

Asking any project manager or business analyst of what is the top challenge that he thinks impacts his ability to accurately and clearly gather, organize and document requirements in his organization, the answer will always be the same: "It is really difficult getting users to articulate what they really need". "Customers are having difficulty thinking in terms of business function and are not willing to commit time to helping us gathering and document their requirements". Sometimes a project manager has to build a rough draft or straw man that they can say, "this works, this doesn't, I really don't need that and can you make it do this?".

So before starting a requirements management plan, there are two things that must occur as input—the signed Charter and the Stakeholder Register. There are many methods of collecting requirements, and the project manager needs to select the best mix of methods for the project. Whichever methodology is chosen, it is imperative to capture the approach and ongoing requirements gathering methodology as part of the requirements management plan. This includes how new requirements will be captured, who is in charge of determining whether or not they are in scope, and how they will be tracked and verified [Stieglitz, 2012].

The collect requirements process is concerned with assessing, documenting and managing stakeholder needs to meet project objectives. All requirements should be gathered at the start because it is costly to make changes as the project progresses. Gathering requirements from all stakeholders will also ensure that their opinions are taken into consideration, which will lead to higher rates of project acceptance. The development of requirements should begin by analyzing information from the project Scope Management Plan, Requirements Management Plan, Project Charter and the Stakeholder Register. The important thing to note is that the needs and requirements of the customer and other key stakeholders need to be translated from high-level

requirements to more detailed requirements that eventually will turn into the deliverables that comprise the Work Breakdown Structure. The inputs and outputs of this process are depicted in Figure 3.4.

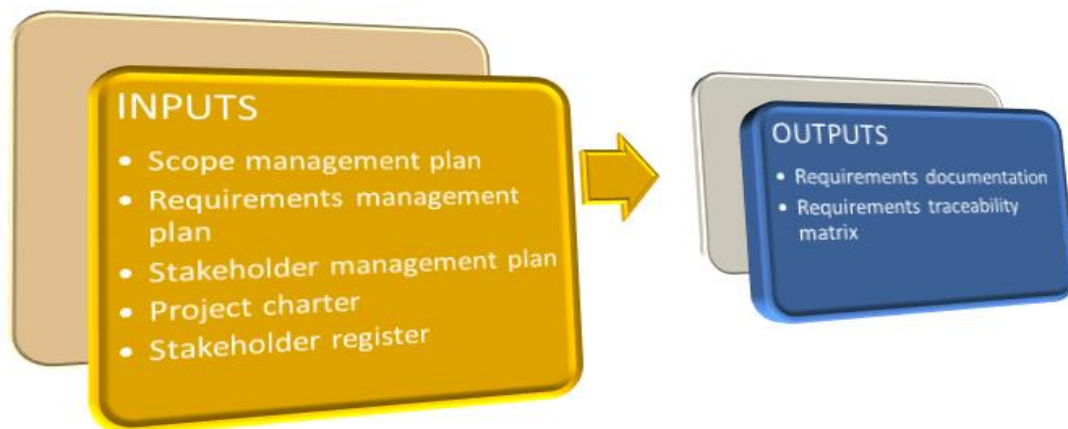


Figure 3.5: Collect Requirements: Inputs & Outputs [adapted from the PMBOK® 2013]

Collect requirements is part of the Project Scope Management knowledge area and takes place at the planning phase of the project. One could ask why project scope is not considered during the initiation phase. The answer is that it is, but only in the broadest sense of deciding on the overall objective of the project. At this stage scope is defined in a fairly approximate way that can be changed as necessary during the planning phase.

Differences in perception of what was meant when the client specified project deliverables can lead to vastly different understanding of what exactly is required. Not only must the scope be agreed up front, it needs to be constantly monitored throughout the project to avoid it changing in a way that will break the budget or timescale, or will contravene stakeholders' expectations of the final deliverable [Team FME, 2014].

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CHAPTER 4: IDENTIFYING THE STAKEHOLDERS

4.1 FROM PROJECT CHARTER TO STAKEHOLDERS IDENTIFICATION

We might sometimes think that identifying who the project customer is might be obvious, but that's not always true. One of the first things we need to know is who the project customer is. First, the customer wants the results the project can deliver and is motivated to support the project to help it finish successfully. Second, the project customer helps define what the project is supposed to achieve. Third, the customer usually provides the funding for the project.

If the customer isn't immediately obvious, two questions can help. Ask who's paying. Whoever pays for the project has a lot of control over what happens and could be the project customer, but not always. Within a large company funding could come from higher in the organization. For example, the sales department might initiate a project to produce new materials but the funding could come from the marketing department. The second question is who approves the project. When funding and approval aren't connected, approvals typically come from the project customer. For example, in the case of undertaking a project about writing documentation for a software development team. The development will probably review the documentation but the director of product management approves the final documentation including the content, format and delivery method. The director is the project customer [Barkley & Saylor, 2001].

If the project customer is a group we also need to identify the one person with final authority known as the project sponsor. The sponsor controls the funding for the project and might also provide or prioritize resources for the project. The project customer and sponsor are just some of the key stakeholders who "have a stake in" or are affected by an activity, decision or outcome of our project work. Yet a good project team would be certain to identify all stakeholders for ultimate project success.

Throughout the project we interact with stakeholders in various and different ways depending on the stage of the project. Stakeholders and their roles must be identified early in the project as the stakeholders' needs and wants are critical elements in the determination of our project requirements and deliverables. The inputs, tools and techniques, and outputs of the identify stakeholders process that takes place in the initiating process group are depicted in Figure 4.1.

Successful organizations are considered those who understand not only who their stakeholders are but how important every stakeholder is and how stakeholders' experiences in one project can impact future project opportunities. Their care and treatment of what some might view as the least important stakeholder should go a long way to make their current customer happy and open opportunities for future work based on the resounding recommendations of very satisfied individuals offering glowing testimonials.

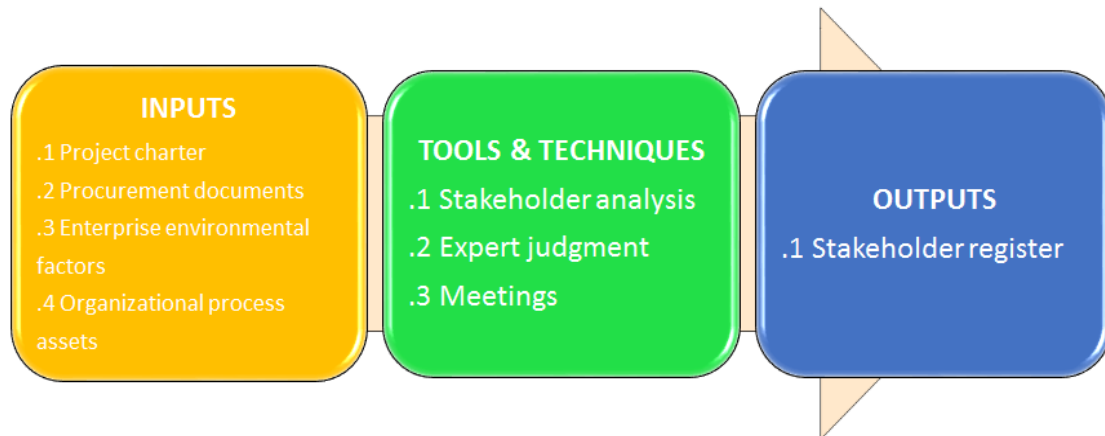


Figure 4.1: Identify Stakeholders: Inputs, Tools & Techniques, and Outputs [adapted from the PMBOK® 2013]

Successful organizations are considered those who understand not only who their stakeholders are but how important every stakeholder is and how stakeholders' experiences in one project can impact future project opportunities. Their care and treatment of what some might view as the least important stakeholder should go a long way to make their current customer happy and open opportunities for future work based on the resounding recommendations of very satisfied individuals offering glowing testimonials.

When a big project is under consideration, mature organizations will write a business case and draft a project charter first. Then present the idea to an oversight committee or governing board to review the cost of the project compared to the benefits the project generates. If the project is selected the governing committee or board will then sign the charter. The charter includes our key stakeholders at the highest levels and decision makers. So identification of stakeholders starts at the very beginning of the project.

Once the project is approved and proceeded to the project team a deeper dive is done to identify all stakeholders, their specific responsibilities and in some cases their team members and their roles. More specifically, the project manager will be checking in with some of the key stakeholders to see who will be working on the day-to-day project tasks from each of these departments and groups. When writing the charter and building the stakeholder analysis worksheet (Table 4.A), we want to make certain we have captured all interested entities that represent our internal and external stakeholders.

There are various techniques that can be used to uncover and analyze stakeholders. Using a variety of techniques helps to draw out the information from different perspectives and angles. The discovery approach may be as simple as asking other stakeholders for input. Existing documentation, such as organizational charts or process flows, can help to identify user groups. Common techniques that can be used in the discovery of stakeholders are brainstorming, decomposition modeling, interviews, surveys, or organizational modeling [PMI-BAP, 2015].

Brainstorming is a data gathering technique that can be used to identify a list of ideas in a short period of time (e.g., list of risks, stakeholders, or solutions to issues).

Brainstorming is comprised of two parts: idea generation and analysis. The analysis is conducted to turn the initial list of ideas into a usable form of information. In business analysis planning, brainstorming can be leveraged to build the initial list of stakeholders, to discover new stakeholders, or to identify a list of tasks to be included in the business analysis work plan.

An organizational chart helps with stakeholder discovery as well. The business analyst reviews the chart to locate stakeholder groups who may be impacted by the product or service. This may include departments who operate or maintain a system, produce a product or service, support customers, or influence product or service decisions within the area under analysis. Based on the size of the organization and how the organizational charts are being leveraged during the analysis, the business analyst determines whether it makes sense to take a role organizational chart down to the individual stakeholder level. If the goal is to only identify the number of groups impacted by the project, the role organizational chart may be the sufficient level of detail required.

Stakeholder name and organization	Project role and responsibilities	Contact information

Table 4.A: Stakeholder Analysis Worksheet

Some typical examples of our primary stakeholders might be the project sponsor and senior management, the project management office (PMO), the project team, the end customers and users. Secondary stakeholders may include our shareholders, environmentalists, local neighborhoods and communities, media, researchers, interest groups or even political organizations. Identifying all stakeholders and understanding how they will be affected is crucial to the success of our project.

Stakeholder identification and analysis in general is not performed independently from business analyst or project manager. It is a best practice to have the project manager and business analyst working closely together and collaboratively with their project and product teams to avoid duplication of effort. Business analysts will develop a work plan to cover the activities they are responsible for performing. However, the stakeholder management plan should be integrated into the overall project management plan managed by the project manager. Collaboration will also provide a more insightful examination of stakeholders as the experiences and expertise of all participants are leveraged to identify project and product impacts [PMI-BAP, 2015].

4.2 STAKEHOLDER ANALYSIS AND MAPPING

Once we have identified our stakeholders, we can start doing some analysis and documenting relevant information about their stake on our project and what influences

they may have on project outcomes. Are they concerned about or can they influence the political elements of our work, economic, social, technical, legal or environmental? To create our stakeholder classification matrix we can simply build upon the stakeholder analysis worksheet [Pande, Neuman & Cavanagh, 2001] started in the charter and add columns that are meaningful for the current project (Table 4.B).

We already have their role in the project, now we can document their interest in our work. We could simply distill down in one or two words or concepts what they care about most. Then we can capture their degree of support for our initiative. Are they potential champions who will carry our message and our cause or are they bystanders who will simply watch? If we think they might resist the change we are trying to create, we can note that as well. Are they steady to their position for a reason or might we be able to change their opinion? Next we can document how much their support or lack of it will impact the project. What are the risks if we ignore or neglect stakeholders? What are the benefits of getting them involved? We can also note who the thought leaders are, they turn to when making decisions.

Stakeholder name and organization	Project role and responsibilities	Interest ¹	Degree of support	Current status ²	Actions Desired (if any)	Impact ³	Risks/Benefits of involvement	Comments

1. High/Medium/Low

2. Advocate, supporter, neutral, critic, blocker

3. High/Medium/Low

Table 4.B: Customized Stakeholder Analysis Worksheet

By identifying and analyzing stakeholders relationships with the project and with our stakeholders, will be prepared to leverage existing relationships to build a strong coalition of leaders. This coalition leadership style helps smooth the path and build awareness and support for the change we are creating. By leveraging the relationships, the project manager will be able to help some key stakeholders understand the change and align them with the Change Control Board decision. Stakeholder analysis identifies the interests, expectations and influence factors of your stakeholders and relates them back to the purpose of our project.

In the analysis worksheet we have gathered the stakeholders identifying information, their positions, locations, roles and contact details. Next, assessment information about the stakeholders' requirements and expectations are elicited along with potential influencers and phases of the project in which each stakeholder has the most interest. We have made note of the stakeholders commitment to the project and the relationship to others involved with the project. We also classified the stakeholders as internal or external, supporter or advocate, a bystander or a potential resister.

Our next step is to create a power and interest grid to plot the individual information gathered into a diagram that represents the entire stakeholder group. As shown in

figure 4.2 on the vertical axis the power is captured as low, medium or high and on the horizontal axis we track their interest in the project as low, medium or high. Project Management Institute in their guide to the PMBOK shares specific strategies to engage with your stakeholders depending on where within the grid each stakeholder falls. PMI also suggests this classification model might capture power and interest, power and influence or influence and impact. In other words we can tailor the matrix to fit our needs.

Stakeholders in the low-low quadrant should be monitored. Communication with them is needed according to the communication management plan. Stakeholders in the low power-high interest portion of the grid should be kept informed. These individuals need to be kept abreast of progress and changes but are not seeking further involvement. Those stakeholders landing on the high power-low interest we want to keep satisfied. We should make sure to be diligent in our communication with this group and involve them as needed to help us achieve project success. The stakeholders that are assessed as having high interest and high concern we will want to manage closely. They may be members of the steering committee or change control board. Our communication management plan will show how often and what kind of project information they are seeking. We'd better respond to any questions or concerns they have in a timely fashion.

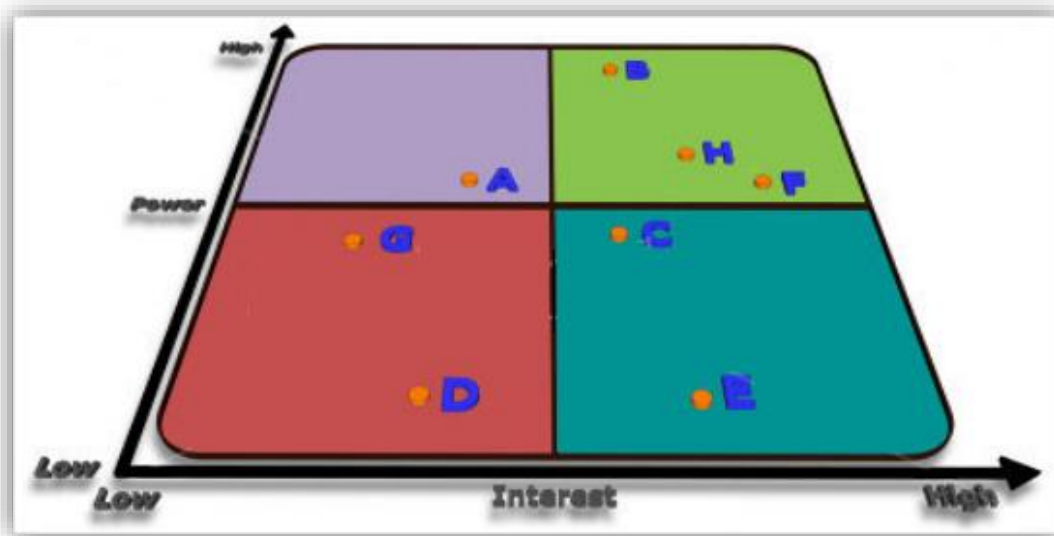


Figure 4.2: Power – Interest grid

We should not forget though that placement within the grid is subjective and maybe done with team input using a nominal group technique. This is because a stakeholder group can be considered complex. This happens for a number of reasons, including but not limited to whether the group is comprised of a large number of stakeholders, is made up of stakeholders with vastly different needs, or interacts with a number of business units to complete their work.

Understanding complexity levels will help when quantifying and planning the number of requirement sessions to conduct, when determining the right amount of requirements-related documentation to produce, and when determining the level of formality to apply in those deliverables. Complexity levels are also helpful to

understand when assessing solution options and the change impacts that a project will have on stakeholder groups.

4.3 ANOTHER STAKEHOLDER CLASSIFICATION

Each stakeholder has varying expectations. Stakeholder prioritization can be challenging on large projects. Having documented our stakeholder analysis in the stakeholder register, about which we will talk later in this chapter in more detail, and examined the power-interest grid, let's see how the salience model helps put project stakeholders into perspective. Unlike the power-interest or power-influence grid, the salience model uses three parameters to categorize stakeholders, power, legitimacy and urgency.

The power parameter is to highlight the ability a project stakeholder has to impose his will or influence the outcome of the project's deliverables. Legitimacy speaks to the appropriateness of that stakeholder involvement in the project. In other words they have rightful proper authority. The urgency classification would register criticality and time sensitivity of that project stakeholder's requirements, needs and expectations. This three-dimensional view of project stakeholders can help the project manager and project team narrow down critical stakeholders and assign priority to the stakeholder group.

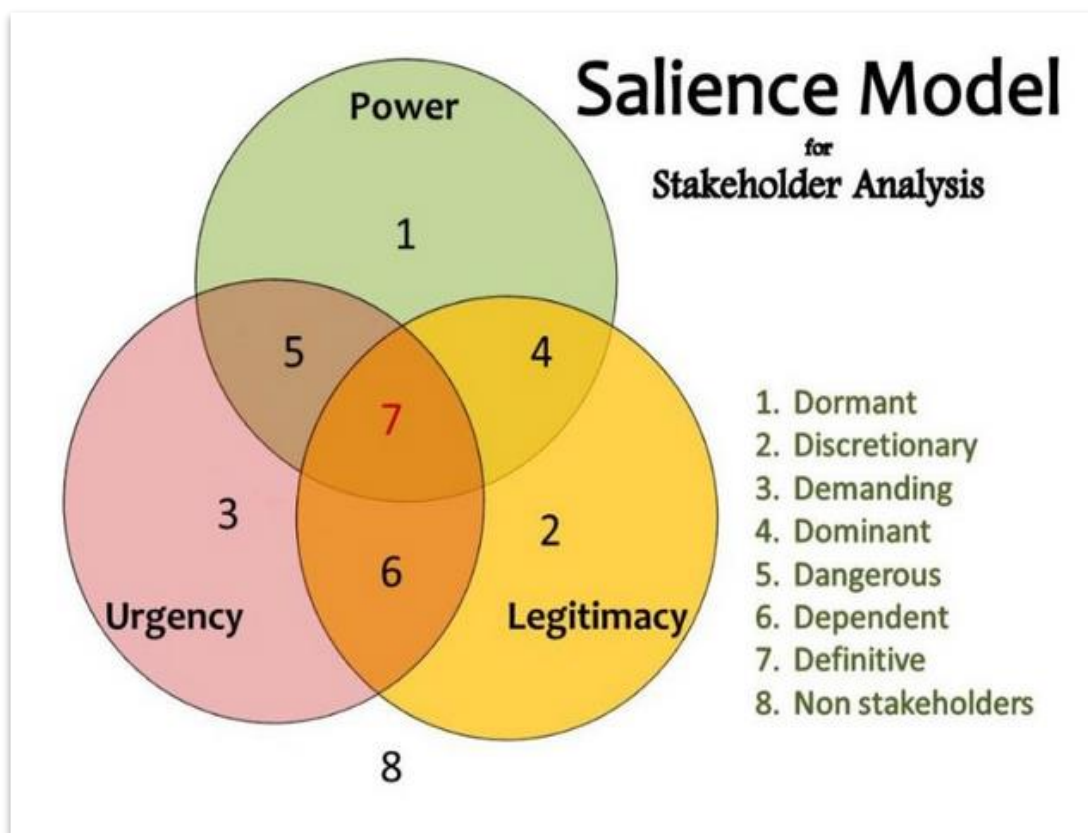


Figure 4.3: Salience Model [Cummings & Patel, 2009]

The salience model for project stakeholders, as shown in Figure 4.3, is graphically depicted as a Venn diagram [Cummings & Patel, 2009]. Each assessment parameter has a major circle and the inner sections of each major circle helps with the identification of project stakeholders that have multiple needs. As we can see from the diagram, the stakeholder that intersects all three circles would be the most "definitive" stakeholder, requiring our focused attention. Stakeholders that intersect two of the circles, range from the "dominant" to "dangerous" or "dependent". We will always want to focus on their expectations and take note of their alignment with other "definitive" stakeholders which could afford them the opportunity to potentially influence our project. It is highly recommended that we keep these stakeholders engage with the project and do our best to satisfy their requests when they line up with the project's goals and direction.

"Dormant" stakeholders will only be heard from if something is going terribly wrong with the project. If we have sufficient details communicated to them on a timely basis showing the project in a green or all good status we won't be hearing from our "dormant" group. Likewise we do not want to micro communicate with this bunch. Proper understanding and adherence to their communication needs along with a good dashboard status on project's progress should satisfy this class of stakeholders. "Demanding" stakeholders tend to think that their concerns are most pressing and need our full attention. Yet they are without power or legitimacy so we must be careful not to spend too much time and energy with their demands. A more suited action may be to assign an assistant to tender their requests and increase their access to published information which may help calm them down a bit.

"Discretionary" stakeholders are those who start needing more attention and may also benefit from increased access to published project information. Checking the communication management plan to see if this group of stakeholders needs more access to project reports could be a proper way handling them. Increased interaction with other team members may help resolve any concerns before items are escalated to the project manager. Besides, the project manager does not to be the sole source of information. And the eighth category of our diagram is "non stakeholders". Investing time and effort on such individuals or groups will not help us shape the outcome of the project.

The salience model applied to project stakeholders is another tool for our use during stakeholder analysis. The more complex the project the more attention we need to pay in managing our stakeholders. We can do all the right project tasks, but mismanaging a high powered stakeholder who also holds legitimate interest and great urgency can cause project failure.

Finally according to business world the stakeholders can be classified to four major stakeholder groups. This stakeholder group classification starts with clients and customers, defined as the recipients of the outcome, product or service of the project. Secondly there is the governance area that includes the systems and processes in place for ensuring proper accountability and openness in the conduct of the business. These are the legislation, regulation, policies, procedures, business values and guidelines that the project must comply with. Thirdly there are the service providers that provide resources and support mechanisms to enable the project deliverables.

And lastly we have partner stakeholders. These are stakeholders that engage in the execution of the activities to perform the outcomes of the project, such as contractors.

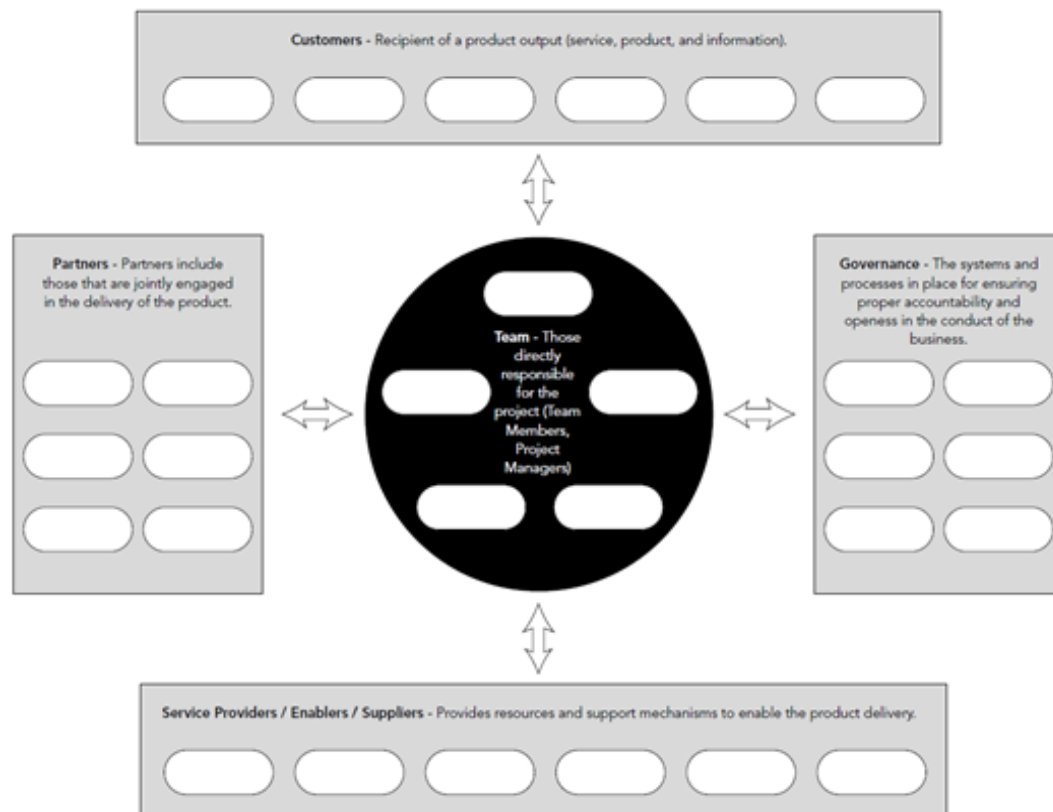


Figure 4.4: Stakeholder Context Diagram [CSU]

This final classification can be depicted in a context diagram as shown in figure 4.4. The context diagram is useful in a workshop setting to draft and confirm the major stakeholders with whom the organization interacts. The most benefit is at the institution level in identifying different customer segments. But it also provides the basis for useful conversations about dealing with partners, e.g., third party providers and research partners. Once the diagram has been satisfactorily completed and all the key stakeholders identified, the narrative table of interactions can be developed.

4.4 THROUGH EXPERT JUDGMENT AND MEETINGS TO STAKEHOLDER REGISTER

Expert judgment is quite often recommended as one among the best tools and techniques in the project management processes. Experts are treated as assets in any organization and provide inputs to planning and estimating any activity as their opinions are considered to be crucial. The experts can be stakeholders or customers. Expert Judgment is one of the best accepted approaches and most useful too during the planning phases of many activities.

The role of the expert is very much needed during stakeholder identification, especially when the project team or the project manager does not have sufficient expertise to carry out a process or activity and can be obtained through individual consultations,

workshops or focus groups. The following experts can assist in a complete identification of stakeholders:

- Upper management;
- Other organizational units (in functional organization);
- Identified key stakeholders;
- Project managers who have worked on projects in the same area (directly or through lessons learned);
- Subject matter experts (SMEs) in the business or project area;
- Industry groups and consultants;
- Professional and technical associations;
- Regulatory bodies, and nongovernmental organizations (NGOs).

The whole identification process will mostly be performed through profile analysis meetings that are used to develop understanding of major project stakeholders. Collective decision making is very important area of project management which can make or break this part of the project. In order for a meeting being successful everyone should have an understanding of the issues and topics being discussed. Everyone should listen attentively and impartially, as well as act with diplomacy to ensure all contributions are heard. Moreover, diversions should be avoided by focusing on the discussion topics. If all these are to happen it is essential that someone takes the role of the meeting Chair to control and direct the proceedings. And who would more suitable for this role than the project manager [Team FME, 2014].



Figure 4.5: Essential features for a good meeting Chair [Team FME, 2014]

The project manager should consider use of a “parking lot” as a tool to keep participants on track. Parking lots are used to minimize sidetracking, derailing, or hijacking of the meeting by participants. The parking lot, created on easel pads, white boards or electronic equivalent, is a place to store topics that have been raised by the participants which do not relate to the session objectives. The project manager should explain the session rules including the use of the parking lot prior to the start of the stakeholders’ identification [PMI-BAP, 2015].

Finally the identification of stakeholders will lead to the Stakeholder Register, which includes classification and assessment information. It is the only output from this process. The Stakeholder Register is nothing more than a formal view of our

Customized Stakeholder Analysis Worksheet. This contains all the details related to the identified stakeholders including the type of information shown in Table 4.C. This information is based on perception and explicitly describes each stakeholder from the perspective of the project. The stakeholder register is elaborated in subsequent processes of this knowledge area.

STAKEHOLDER REGISTER							
Project Title:			Date Prepared:				
Name	Position	Role	Contact Information	Requirements	Expectations	Influence	Classification

Table 4.C: Stakeholder Register

Even though it is a legitimate document, in that it helps the project manager to communicate with all those listed, the information it contains can be sensitive and is one perception at a specific point in time. This makes the register a potential to be a source of controversy. For example, a department head might be described as having a negative attitude to the project because it will have an adverse impact on them personally. However, he or she could feel that they are being unfairly misrepresented in a way that could damage their future prospects within the organization. For this reason, this document should be available only to the project manager and perhaps one or two trusted project staff.

Stakeholder’s information needs and requirements documented in the Project Register along with the Project Management Plan will be the main inputs for the Plan Communications Management process. This is the first process of Project Communications Management knowledge area, which includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information. Effective communication creates a bridge between diverse stakeholders who may have different cultural and organizational backgrounds, different levels of expertise, and different perspectives and interests, which impact or have an influence upon the project execution or outcome.

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CHAPTER 5: PREPARING FOR STAKEHOLDER ENGAGEMENT

5.1 PLAN STAKEHOLDER MANAGEMENT PROCESS

During planning we flash out two major aspects of our project. How are we going to get the project done and how are we going to run the project. We put all this information into a set of documents known as the project management plan. If we have already defined the project we have a good foundation for our plan. As we work out the details we might uncover additional information about the project such as new deliverables, risks or assumptions. All we have to do is update our existing project summary or other files with the info.

There are four main components to planning the work that has to be done. First we have to identify that work, exactly what work has to be done to deliver the desired results. Second we have to calculate how much time it will take to perform that work and how much it will cost. Third we need to determine who we need to do the work and in what way they will engage with the project. Fourth we build a schedule of when work will occur and how many days or weeks it will take.

So the purpose of designing a stakeholder engagement strategy is define the required level of stakeholder involvement and the associated scope of activities each stakeholder will ideally support. This step also helps set expectations about win and how stakeholder groups will be engaged throughout project life cycle. Proper planning and communication will allow you to proactively manage activities to sustain your stakeholder level of engagement, build buy-in and commitment and address any potential roadblocks.

As mentioned before, stakeholder analysis is so important that a wide variety of experts are consulted to help analyze the actual level and the desired level of engagement of the various stakeholders. These experts are the same ones that were consulted in the previous process to identify the stakeholders and analyze their interest and/or influence on the project in order to determine the general strategy for engaging them.

As well as this, there are several areas within the PMBOK that provide guidance on engaging with our stakeholders. The purpose of the plan stakeholder management process is to build the stakeholder management plan. This plan will be a subsidiary component of our project management plan. Some of the elements we might capture here will be stakeholder engagement levels, relationships and potential overlap between stakeholders and stakeholder communication requirements such as type and frequency of information. In addition to this level of detail required will be included whether we will push information out to them or provide them access to data or information when they need it from a cloud location or shared server site. The inputs, tools and techniques and outputs of this process are depicted in Figure 5.1.

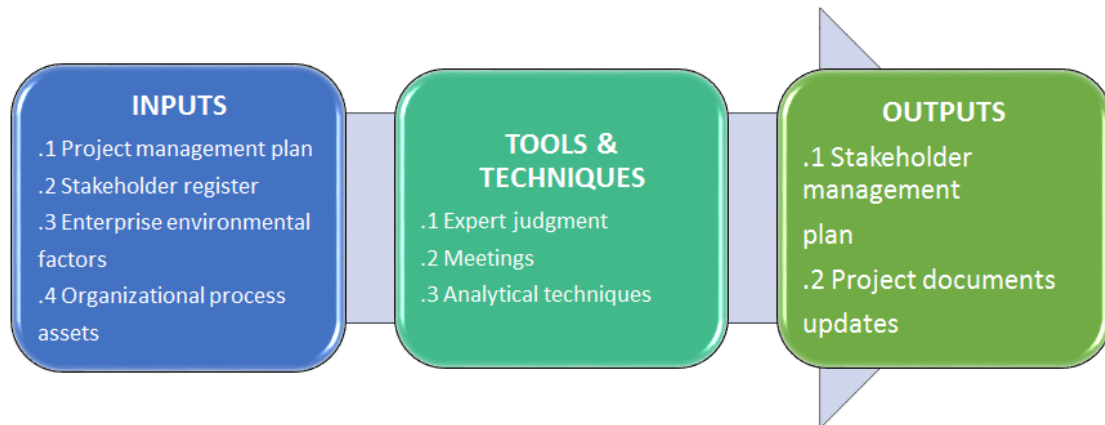


Figure 5.1: Plan Stakeholders Management: Inputs, Tools & Techniques, and Outputs
[adapted from the PMBOK® 2013]

5.2 ENGAGEMENT PLANNING

Having finished with stakeholder identification and analysis will lead us to building a base of knowledge by developing our perspective, scope, and understanding of who we are engaging with and why we are engaging them. Preparation for engagement will bring our knowledge to fruition. It will help ensure that our engagement is not an end in itself but a means to a process of continued dialogue with those most important to our business—our stakeholders. Before diving in though, we should gather our internal stakeholder engagement team and reach out to the stakeholders as identified and mapped in stakeholder register to develop and communicate short-term and long-term goals for the engagement. These goals will help guide the rest of our preparation process.

Depending on the scope of our engagement strategy, we should consider using multiple tactics to address different stakeholder groups simultaneously. Tactics are high-level descriptions of how we approach stakeholders. The spectrum is simplified into three categories: engage, communicate, and inform [BSR, 2009]:

- *Engage* describes stakeholders with whom engagement is necessary.
- *Communicate* describes stakeholders with a high willingness to engage or a high level of expertise but who have not yet participated in dialogue with our company. Communicating more with these stakeholders will help them value engagement.
- *Inform* describes stakeholders who seek information only instead of a conversation.

The nature and frequency of this engagement should reflect the level of project risks and impacts. The purpose of a Stakeholder Engagement Plan is to describe a company's strategy and program for engaging with stakeholders in a culturally appropriate manner (whether it be for a single project or a range of company operations). The goal is to ensure the timely provision of relevant and understandable information. It is also to create a process that provides opportunities for stakeholders to express their views and concerns, and allows the company to consider and respond to them.

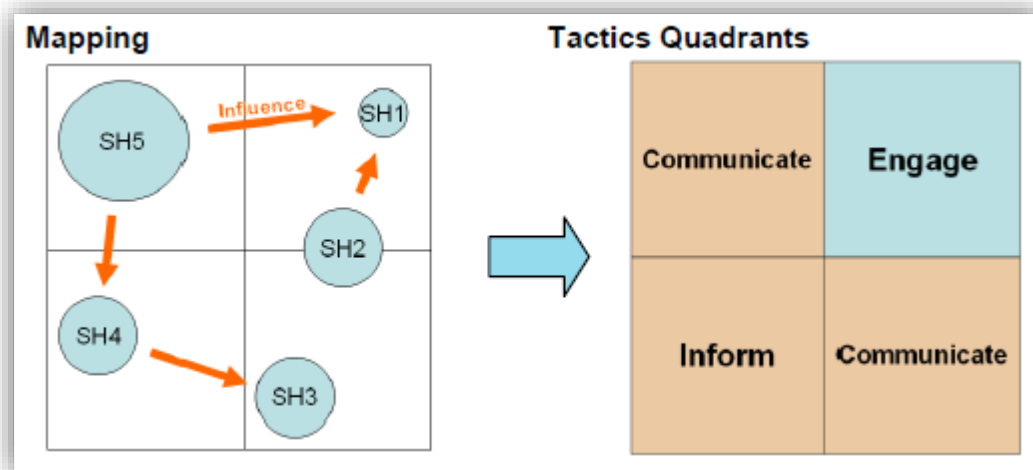


Figure 5.2: Mapping and Engagement [BSR, 2009]

Key principles of effective engagement include:

- Providing meaningful information in a format and language that is readily understandable and tailored to the needs of the target stakeholder group(s)
- Providing information in advance of consultation activities and decision-making
- Disseminating information in ways and locations that make it easy for stakeholders to access it
- Respect for local traditions, languages, timeframes, and decision-making processes
- Two-way dialogue that gives both sides the opportunity to exchange views and information, to listen, and to have their issues heard and addressed
- Inclusiveness in representation of views, including women, vulnerable and/or minority groups
- Processes free of intimidation or coercion
- Clear mechanisms for responding to people’s concerns, suggestions, and grievances
- Incorporating feedback into project or program design, and reporting back to stakeholders.

5.3 TOOLS AND TECHNIQUES

Stakeholders have to be characterized as regards contributions needed from them, the expectations they have concerning rewards for delivering the contributions, and their power in relation to the project. Contributions can be in the form of specific deliverables, a positive attitude, or specific behavior like making a supportive decision. Contributions in the form of deliverables can typically be found in the project mandate while other contributions need to be assessed by the project manager or the project team. One type of contribution can be supportive behavior which is related to a positive attitude towards the project.

This can be assessed in a stakeholder engagement assessment matrix as shown in figure 5.3, which will document the current engagement levels of key stakeholders and the desired level of their engagement. To build such a matrix we can put stakeholders in the far left column and then list one stakeholder on each subsequent row. Additional

columns can be added across the top to indicate the current engagement level of each stakeholder and our desired level for that stakeholder to engage.

So additional column headings might include the titles “unaware”, “resistant”, “neutral”, “supportive” and “leading”. We would then place a C in the column that represents that stakeholder’s current engagement the project and a D in the column that represents where we would like that stakeholder’s desired level of engagement.

When we finish compiling the matrix we will have a clear understanding of those stakeholders we may need to provide more information so we can get these folks more involved and enthusiastic about the project goals. The more stakeholders we have aware of our project and supporting our efforts, the stronger our coalition of leaders. This coalition can help bring about the desired change with much more ease and acceptance than a single individual trying to accomplish the same thing.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Suppliers			CD		
Top Management				C → →	→ → D
Colleagues in the permanent organisation		C →	→ → → →	→ → D	
Grumbler				C ← ←	← ← D

C = current position, D = desired position

Figure 5.3: Stakeholder Engagement Assessment Matrix example [Jepsen & Eskerod, 2009]

The project manager must also determine expectations and benefits desired by each stakeholder. This is the “price” that has to be paid for the needed deliverance and/or compliance from each stakeholder. “Price” has to be understood in a broad sense, not only as direct monetary payment. For internal stakeholders, the payment can also be in the form of rewards like for example a salary raise, new computer facilities, professional challenges or a feeling of meaningfulness. The reward may be expected sometime in the future [Eskerod, 1998]. External stakeholders typically want other benefits, like influence on the project process or the project objectives, good-will, access to the project results, positive publicity, praise, or attention. There is only limited advice concerning how to acquire the information needed to characterize the stakeholders as regards expectations concerning rewards. However, Varvasovszky and Brugha [2000] suggest the use of face-to-face interviews and questionnaires. The project manager carries out a startup dialogue with each team member and his/her line manager in which their expectations and benefits can be assessed.

The final characterization parameter for stakeholders is the power that the stakeholders have as regards influencing the project. The power may be assessed by the project team and the project manager for example based on their knowledge about the stakeholders and the organizational context.

The output of this stakeholder analysis produces a worksheet with each stakeholder's specific needs and interests. During our current activity, when we shift a stakeholder from unaware to supportive we may also need to refresh the earlier worksheet through progressive elaboration. Capturing these details helps the project manager anticipate stakeholder feedback at subsequent checkpoints. Project managers can also rate stakeholder importance through the power and interest or salience model so the input provided by and to the stakeholders can be prioritized.

Additionally, project managers should consider establishing a contract or written agreement signed by the project manager and the stakeholder, so everyone knows what roles they can be expected to play during the project's life cycle, such as reviewing documents, contributing resources, producing deliverables or approving reports. We will need to decide up front who should have access to documents we create about our stakeholders. Some documents may have sensitive information that should only be shared with our core project team rather than be stored on a shared server or a cloud location.

Stakeholder management is about making stakeholders contribute to the project as needed. Therefore, the strategy for influencing the stakeholders must be based on a need to alter or support each stakeholder's inclination to deliver the needed contributions and the resources required to do so. Stakeholders who are supportive are expected to be more compliant than stakeholders who are in some level of opposition. Therefore, they will need less attention than stakeholders who are powerful and in opposition. Consequently, it's really important that we communicate with all project stakeholders to discover and manage their expectations before and during project execution. Active and thoughtful stakeholder engagement strengthens our chances for well received projects, supportive participation and successful outcomes.

5.4 STAKEHOLDER MANAGEMENT PLAN

The main output from plan stakeholder management process is the stakeholder management plan as shown in figure 5.4. A good plan should:

- describe regulatory, lender, company, and/or other requirements for consultation and disclosure
- identify and prioritize key stakeholder groups
- provide a strategy and timetable for sharing information and consulting with each of these groups
- describe resources and responsibilities for implementing stakeholder engagement activities
- describe how stakeholder engagement activities will be incorporated into a company's management system.

In fact, stakeholder engagement is an umbrella term encompassing a range of activities and interactions over the life of a project. In order to accomplish effective stakeholder engagement and build a successful management plan, we should have taken into consideration any previous stakeholder engagement activities our company has undertaken, including information disclosure or consultation. As well as this, we

should already be aware of what staff and resources will be devoted to managing and implementing the company's Stakeholder Engagement Program. Who within the company will be responsible for carrying out these activities? What budget has been allocated toward these activities? For projects (or multiple company operations) with significant or diverse impacts and multiple stakeholder groups, it is good practice for a company to hire a qualified Community Liaison Officer(s) to arrange and facilitate these activities at the project and/or corporate level. Integration of the community liaison function with other core business functions is also important, as is management involvement and oversight.

STAKEHOLDER MANAGEMENT PLAN					
Project Title: _____			Date Prepared: _____		
Stakeholder Name	Unaware	Resistant	Neutral	Supportive	Leading
C = Current level of engagement D = Desired level of engagement					
Stakeholder Name	Communication Needs	Method/Medium	Timing/Frequency		
Pending Stakeholder Changes					
Stakeholder Relationships					
Stakeholder Engagement Approach					
Stakeholder	Approach				

Figure 5.4: Part of Stakeholder Management Plan

Stakeholder Management Plan is input to Manage Stakeholder Engagement process but Stakeholder Register is not. While creation of Stakeholder Management Plan, Stakeholder register refers to requirements, needs and expectations of the listed stakeholders. In Manage Stakeholder Engagement process, we need to communicate with the stakeholders as per stakeholder management plan. For this reason we don't refer Stakeholder register in the Manage Stakeholder Engagement process as we get all the information related to the communication needs of stakeholders from

Stakeholder management plan. On the other hand, during the collection of Requirements, Stakeholders are required to be actively involved, so here we need both, list as well as their communication requirements to see which stakeholder is in the role or position to add requirements, what kind of communication preference that stakeholder has, what level of engagement that stakeholder holds etc.

Finally, due to the importance of stakeholder management other project documents that may be updated are project schedule and stakeholder register. Therefore we must be familiar with the way stakeholder engagement activities will be integrated into the company's environmental and social management system and with other core business functions. Who will have management oversight for the program? What are the plans for hiring, training, and deploying staff to undertake stakeholder engagement work? What will be the reporting lines between community liaison staff and senior management? How will the company's stakeholder engagement strategy be communicated internally? What management tools will be used to document, track, and manage the process? (e.g. stakeholder database, commitments register, etc.) For projects or company operations involving contractors, how will the interaction between contractors and local stakeholders be managed to ensure good relations?

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CHAPTER 6: SCOPE AND REQUIREMENTS

6.1 SCOPE VS REQUIREMENTS

There is a great deal of truth in the saying “projects don’t fail at the end, they fail at the beginning” and whilst failure may not appear obvious until the final stages of a project, the post-implementation review often finds that were known issues with the project which could and should have been addressed at project inception.

These issues often turn out to have to do with the scope of the project. Whether we talk about project or product scope, ‘defining scope’ is an exercise in fact finding, documenting and gaining agreement about what needs to be done and how. The key benefit of this process is that it describes the project, service or result boundaries by defining which of the requirements collected will be included in and excluded from the project scope. I find though that there’s a lot of confusion on the difference between scope and requirements. We have an elaborate process where requirements are collected using various tools and techniques, but why is there another process that talks about scope?

A project scope defines precisely what is included and what is not included by clarifying the boundaries. It is counter-intuitive in many ways, because often organizations try to deliver more than was agreed upon, to exceed customer expectations. This can be called ‘gold plating’, and can cause projects to overrun schedules, budgets and hence increase risk. It is very easy in performing collect requirements that folks will ask for more than they actually need.

The project scope is the work performed to deliver a product, service or result. The product scope is comprised of the features and functions that characterize the product, service or result. Requirements describe features and functions of the final product, service or result for the project; therefore there is a direct relationship between the number of requirements and the product scope. The more approved requirements there are, the larger the product scope and the project scope [PMI-BAP, 2015].

To be in control of scope throughout the project requires close management of collect requirements, the details etc, and the processes. Any scope changes must be handled in a structured, linear, and controlled manner. Each requirement is documented clearly along with its acceptance criteria as it is vital that the scope is well defined and clearly communicated. The key to the success of scope control is to ensure that if any change is requested, that it is first evaluated, captured and documented and that no change should be implemented unless it is clear that it is necessary, and that the right authority has first been given for its implementation. It is important to compare this against the output from collect requirements.

I think the best way to look at requirements are to view them as “ideas made form”. Of course, this perspective opens a whole can of worms about the nature of ideas. It’s important we do that though, or we can’t really understand the underlying issues that call for the existence of a Requirements Management Plan. We all have ideas. But

what happens when we try to articulate one to someone so they can write it down? Often the words we use fail to give our idea justice. If we think of a tree, for example, we might in our head picture a lush evergreen standing in the middle of a snowy field. If we ask someone else to draw "a tree", though, they'll be just as likely to create a maple, or an oak or even a stout magnolia denuded of branches. Ideas are incredibly easy to misinterpret, even when we do our best to be super precise.

Individual requirements can be compared to personalized objectives. They are goals which are desired to be achieved. In many leadership courses, the acronym SMART [Crisfield & Sollars, 1992] is used to assist people in setting down good objectives. For personalized objective setting T stands for time-bounded in that the objective must be achieved by a specified date. However, as many requirements are dependent on other requirements or are part of a higher level requirement, it would be better for a project manager to think of T as standing for Traceable. If it is not possible to envisage how a particular requirement is related to other requirements and to know where it came from, then it is not a SMART requirement. Using the SMART framework a document can be checked and every requirement can be verified as correct in terms of expression. However, it is worth noting that a badly expressed requirement is usually a case of incorrect or incomplete analysis. Therefore it is expected that a SMART document is more likely to be technically correct.

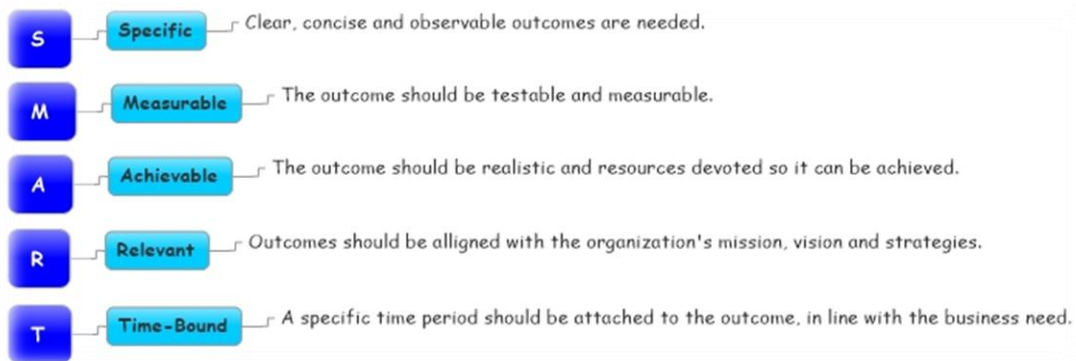


Figure 6.1: SMART Goals and Objectives [PMI-BAP, 2015]

On the other hand, we could say that project scope captures all the work that happens on a project, as measured in time and cost. That's a nice tidy definition and all, but it's a bit hard to articulate when we're still in the beginning stages of a project. Unless we have a crystal ball, we don't really know what all that work will look like. But, just as with requirements, it might be a lot less painful to think about problems that might occur around the project scope first, and deal with them...once they're out of the way, we can go into more detail.

Below are two documents that attempt to address all of the issues outlined above. These are the Scope Management Plan and the Requirements Management Plan. The Scope Management plan describes how the scope will be defined, developed, monitored, controlled and verified and the Requirements Management Plan describes how requirement activities will be planned and tracked.

SCOPE MANAGEMENT PLAN	REQUIREMENTS MANAGEMENT PLAN
What steps will we need to take to prepare a really good project scope statement?	How will our we plan, track and report our requirements-related work?
Who do we need to involve, and what steps should we take to prepare a robust Work Breakdown Structure?	How will we prioritize our requirements? They can't all be equally important!
How will we maintain and approve our Work Breakdown Structure?	How will we handle changes to our requirements, corrections to requirements we misinterpreted, or new requirements we missed during earlier stages of the project?
What should formal acceptance look like for the finished things that we make?	What measurements should we use to make sure we're realizing our requirements correctly?
How will we deal with change requests to the work we decide we need to do, once it gets underway?	When we finish making something, how will we be able to tell that finished piece matches up with an existing requirement?

Figure 6.2: Scope vs Requirements Management Plan

In short, requirement is outward facing – specified by customer/business; and scope is inward facing – to be implemented by the project to satisfy requirements. Requirements are capabilities that are required to be present in the product, service or result that project is supposed to produce, in order to satisfy a formal agreement (which could be a Contract). They define the product behavior and indicate what is that users want from the product. Scope is the sum of product, service or result to be provided by the project. Scope indicates the activities that need to be done in order to achieve the requirements. First we understand customer’s business requirements and then turn them into project scope. That is why Collect Requirements process is followed by Define Scope process.

6.2 SCOPE MANAGEMENT

Scope Management is the collection of processes which ensure that the project includes all the work required to complete it while excluding all work which is not necessary to complete it. As well as defining the scope of the project in the planning stage it is also necessary to actively manage it. By the end every project we turn something over to the project customer. Sometimes the project goal and what we deliver are one and the same. In other times we need to translate the project goal into one or more items we can deliver. The things we hand over are called deliverables. They might be tangible results like a software program or a new office space for our company. Some deliverables are not so concrete such as a new service we offer or a process we design for tracking finances for an accounting client.

Deliverables help us define the scope of the project. If we hire someone or someone hires us the contract we sign will probably include a project scope statement and a list

of deliverables. The process of identifying project deliverables is often more of a discussion than one person saying this is what I want to someone else.

A few questions can help us home in on project deliverables. "What tangible results do you expect?" Less concrete goals increase sales for example. Still can have results we can see or feel such as new sales material and advertisements. "How will we use these results?" This question helps add details to the description of what is delivered. Are we handing out information posting it to a web site or using the info to explain services to potential customers? "Who will give these results to?" We can learn more about deliverables by finding out who will use them. Plus we know who else to talk to if we have questions about what is needed.

On large projects we might prepare detailed descriptions of deliverables which are known as requirements. For smaller projects we still describe what we want but typically in less detail. A table or a spreadsheet is handy for listing the deliverables. It's better start filling out our spreadsheet with the end deliverables which are the results we hand off at the end of the project. The end deliverables help us confront that the project is done what is supposed to.

Once the project gets underway we can use intermediate deliverables to measure progress. Although some intermediate deliverables will be identified early in the project, we may identify others during planning or even after work gets underway. During planning it's a good idea to identify additional deliverables that can be completed every week or so. That way we can evaluate progress on a regular basis.

Along with the deliverables, success criteria must be defined so that the successful outcome of the project is clear. Success criteria might be fairly simple and straightforward. Tangible deliverables with built-in measures are the easiest. Ideally we want success criteria defined so we can ask 'is this what you wanted' and get a simple 'yes' or 'no'. We need to come up with a way to measure success. The measures we use will vary depending on the project.

Deliverables Spreadsheet				
Customer: _____				
Project name: _____				
Deliverables	Description	Success Criteria	Notes	Resources

Figure 6.3: Deliverables Spreadsheet

With less obvious criteria we also need to think about methods for verifying these results. For instance, we might survey our clients to see what they think about the changes we are planning. The tasks we develop should be simple and easy to administer. Surveys and questionnaires can be another way to measure quality and results for more abstract projects, such as the design of a new company logo or the

usability of a web site. For example we can ask fifty of our customers what they think of our new logo or we can ask end users to fill out a questionnaire about our product's ease of use.

Early in the project we don't have to describe all the criteria for every deliverable. We should start with the final deliverable we will give to the customer. That one is particularly important because it usually ties into getting sign-off that the project is complete and it might trigger the final payment.

With the project deliverables and success criteria in place it's time to start working on the scope statement, a document that clearly delineates what is included in the project and as important what is not included. For a small project with straightforward deliverables the scope statement might be as simple as the list of deliverables and success criteria. The scope statement is often included in a legal agreement if the project involves one person or company hiring another. We might also hear the scope statement called a statement of work. A clear scope statement helps prevent a project from losing beyond its boundaries. This all too common problem is called scope creep. This is because there are two groups of stakeholders that will almost invariably apply pressure to change the scope of the project throughout its life cycle.

The first group can be thought of as essentially external and include project sponsors and end-users. These groups may not have got everything they wanted included in the initial project specification and use the 'requested change' route to incorporate elements that were not included during the initial development of the project scope statement. This can also happen when stakeholders become aware of the potential of the new system and mistakenly believe that adding incremental improvements during the course of the project will create a better solution without increasing risk or cost.

The second group who may champion changes to the scope of the project can be thought of as internal. These are project team members who are usually under the direct control of the project manager, for example engineers or analysts. Their motivation is quite different from the first group and usually has more to do with professional pride or intellectual curiosity than purely functional factors. Their suggestions can get a lot of support from within the project team from people who think that delivering extra or higher quality than was specified is a desirable thing to do because of the recognition that it will bring.

For this reason, it is important that the approach to managing the project's scope be clearly defined and documented in detail. If someone wants to add something in the project we can use the scope statement to decide whether the addition makes sense or not. If we run into trouble with the budget, schedule or availability of resources one option is to reduce the project scope. Furthermore, in order to successfully manage a project's scope it's important that all roles and responsibilities for scope management are clearly defined from the very beginning. Of course these information have already been documented in the Stakeholder Register which has been filled through stakeholder identification process and will be an input for the Collect Requirements process.

6.3 COLLECT REQUIREMENTS

During planning phase of the project we manage the collection of requirements. As most organizations have many pivotal people in essential roles and business analysts need to ensure that all appropriate individuals are consulted and their ideas heard. A new business process that is great for one part of the business but cripples another part of it is not useful. As well as this, the business analyst must ensure that the vital stakeholders have their viewpoints heard, the ideas incorporated to the project as appropriate and the project's direction is always at the best interest of the business.

This process is concerned with assessing, documenting and managing stakeholder needs to meet project objectives. All requirements should be gathered at the start because it is costly to make changes as the project progresses. Adaptive life cycles, in particular, are developed with the intent of keeping stakeholder influences higher and the costs of changes lower throughout the life cycle than in predictive life cycles [Schwaber, 2004]. Gathering requirements from all stakeholders will also ensure that their opinions are taken into consideration which will lead to higher rate of project acceptance.

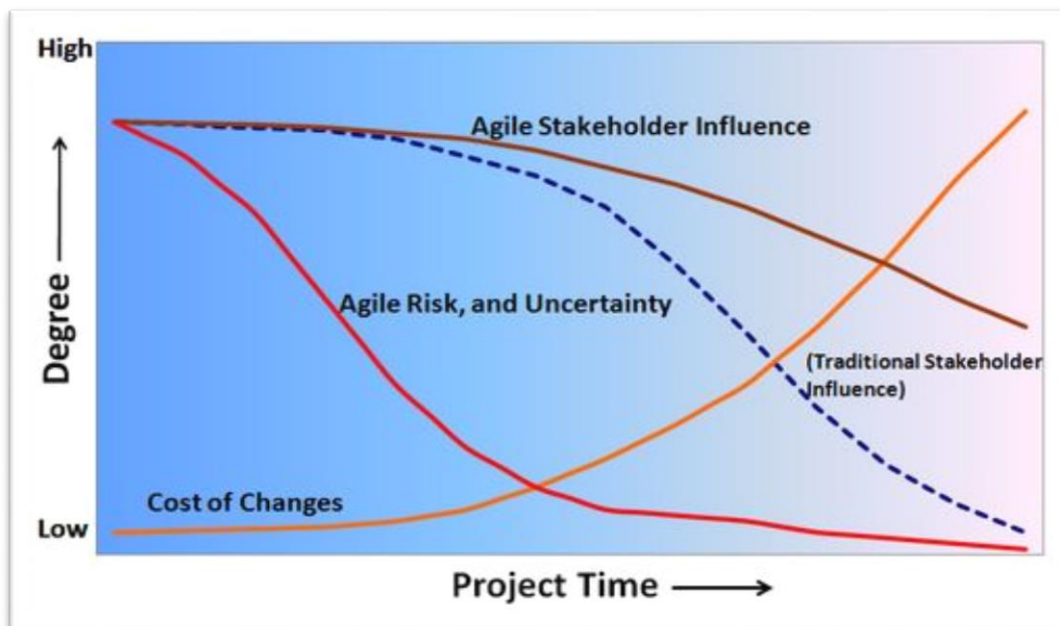


Figure 6.4: Impact of Variable Based on Project Time [adapted from the PMBOK, 2013]

The development of requirements should begin by analyzing information from the project Scope Management Plan, Requirements Management Plan, Project Charter and the Stakeholder Register. The important thing to note is that the needs and requirements of the customer and other key stakeholders need to be translated from high-level requirements to more detailed requirements that eventually will turn into the deliverables that comprise the Work Breakdown Structure. Cost, schedule, quality planning and sometimes procurement are all based upon these requirements. The key benefit of this process is that it provides the basis for defining and managing the project scope including product scope. The inputs, tools and techniques, and outputs of this process are depicted in Figure 6.5.

The collect requirements process requires the right sources, the right information, the right technique, clear organization, evaluation and understanding and accurate reporting. A good list to guide the steps here would include these five key items. At first we should engage key stakeholders to determine requirements. Then we should select from common requirements gathering techniques the one that fits better with the occasion. After that it's good to prepare to conduct selected requirements gathering activities. It is also important to communicate with stakeholders using these techniques. Finally it's equally essential that we gather the proper information for requirements analysis and documentation.

In order to conduct requirements collection in an effective way we must consider our sources of information and then begin our investigation. It might be necessary to talk to people one on ones or in groups and review available material. We should pick the requirements gathering techniques we want to use for our audience and our project. Sometimes we must ask the same questions in a lot of different ways just to see if what is captured so far is correct. Once we begin writing down the questions we want to ask we could save these questions from one project to another, as it might help. The lessons we learn on each project will help us ask better questions on the next projects. We will be asking strategic questions to get the big picture as well as detail questions to understand the nuances of how the work is being done today versus how it should be done tomorrow and how the stakeholders want it to be done when the project is successfully completed.

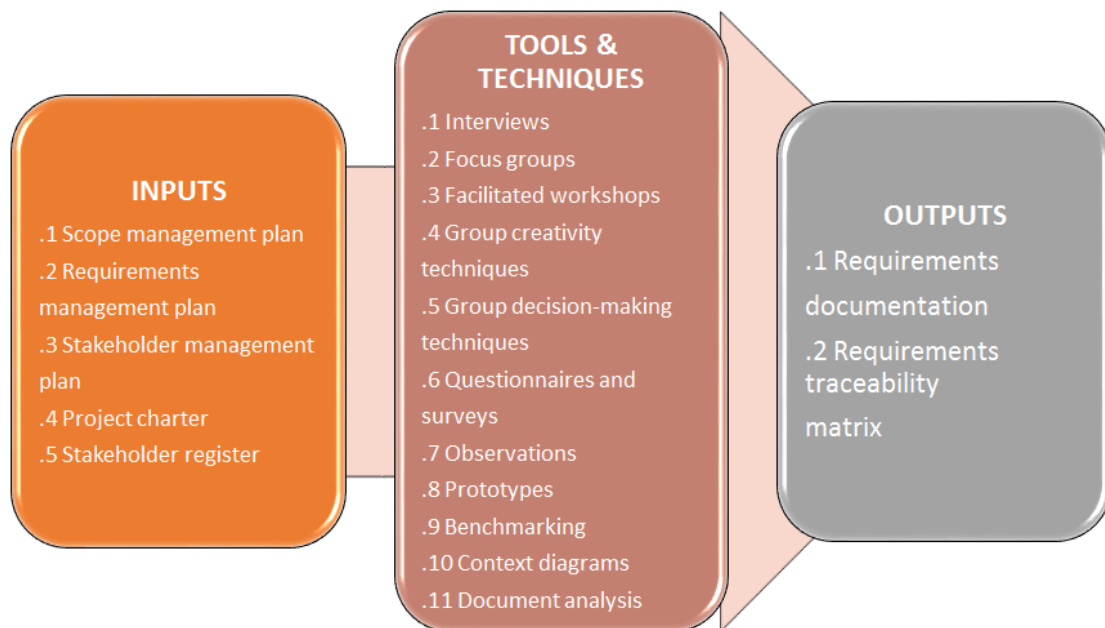


Figure 6.5: Collect Requirements: Inputs, Tools & Techniques, and Outputs
[adapted from the PMBOK, 2013]

The challenge comes when stakeholders don't really know what they want or express their ideas in general, nonspecific terms. More questions need to be asked for clarification. When stakeholders express their requirements in their own terms with implicit knowledge of their own work our communication will focus on that stakeholder being the expert. Making a statement something like: "I need to know what you know and translate that into words everyone on the team will understand so we get this right" might help us capture information that would be better understood by all.

There are many elicitation techniques available. Some are more one-on-one type of techniques, some are more group-focused, and well others are technology or existing system focused [Brennan, 2009]. Let's start by looking at the best elicitation techniques from one-on-one elicitation.

Interviews are a great way to go when we pick the right people and come with properly prepared questions. Better yet is to send the entire list of questions to stakeholders before the meeting so they have time to prepare too. First steps in the interview may be to break the ice with some general conversation to help build rapport. We may observe things in the stakeholder's office or surrounding that allow us to ask some gentle opening questions about something of interest to them such as a vacation photo they have on their desk. This works well with some folks but not with others. If we are familiar with the DISC Personality Profile System this will work well with our I and S personalities but not for the D and Cs personalities. For some more ideas on how DISC can help us better understand and approach the people we are interviewing there will be a more comprehensive reference in a next chapter.

Observation is our next technique that has also been called job shadowing. Using observation techniques are best applied when a current process is to be monitored and the objective is to improve the process, when stakeholders find it hard to explain what they do or what their requirements are, for highly repeatable processes or the validity if the data collected through other means is in question. Assessing a process or system from the user's interaction perspective is an instant way to elicit requirements. Assessing the actions undertaking a stakeholder's work environment allows us to watch them perform their work in order to understand the flow and sequence of the activities.

Surveys or questionnaires can also provide tones of very helpful information to help us gather requirements. We want to carefully design the questionnaire and determine if we want to ask open or closed-ended question types. A challenge here is making sure we are not leading their responses but allow for them to really tell us what is important to them.

Next are our group creativity techniques. There is nothing quite like the power of the group mind. Strong facilitation skills are required to focus the group and get helpful input. Brainstorming provides out-of-the-box thinking and can often generate new ideas from the group dynamics. Idea/mind mapping is another group technique in which ideas created through individual brainstorming sessions are consolidated into a single map to reflect commonality and differences in understanding, and generate new ideas. If we have multiple alternatives with an expected outcome in the form of future actions we could use group decision-making technique, such as unanimity, majority, plurality or dictatorship in order to generate, classify, and prioritize product requirements. When the stakeholders have very different ideas our challenge will be to help facilitate agreed outcomes from these group processes.

Focus groups have very specific and often narrow areas of concentrated dialogue with key subject-matter experts that can provide the proper information. Facilitated workshops can be a whole range of things from a few folks gather in the cafeteria trying to clarify some things we are thinking about to a more formal meeting carefully walking through what is needed for this project, to an agile approach like time-boxed

go-fast sessions. Group sessions often produce good data and members now have some skin in the game or a sense of commitment to the project.

Then there are elicitation tools for existing staff such as document analysis, interface analysis or reverse engineering. Of course these techniques are not meant to be standalone. They are meant to be combined in a way that is most useful for our project. These techniques are also meant to be iterated. We are never going to get all the information upfront. We will start modeling, analyzing and figuring out what the real requirements are and then we will go back and get more information to clarify, fill in the blanks and look at different things.

Prototyping techniques and context diagrams can be technology-based or much simpler approaches like outlining or paper prototyping, storyboarding or wire framing. They can be very effective at gathering feedback. When enough feedback cycles have been performed, the requirements obtained are sufficiently complete to move to a design or build phase. Often, when people cannot articulate a particular need in the abstract, they can quickly assess if a design approach would address the need. In order to compare and improve actual or planned practices, such as processes and operations, to those of comparable organizations to identify best practices, generate ideas for improvement, and provide a basis for measuring performance, benchmarking could be a fitting technique.

The problem with requirements though is that we are often not given enough time to develop them as we would like. Usually the requirements piece is given 10-15% of the development life cycle which will force us to work smart and really quickly. So we may be faced with tradeoffs decision making on the techniques we use, based on the time constraints. Some of the above techniques are very good, yet take a significant amount of time. When we are done with this step we will have the stated requirements. The business analyst or project team member tasked with gathering requirements will now need to analyze all the information provided to derive the real or final requirements. When more requirements are given than we have time and money to accomplish, we will need to have some prioritization techniques to select the final requirements that fit within our constraints.

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CHAPTER 7: REQUIREMENTS IN THE MODERN ERA

7.1 BEING ON THE SAME PAGE

Once the scope management and requirements plan is in place, the real fun begins, as it is time to collect all of the requirements— “all,” not just some. It doesn’t even seem to matter what kind of requirements we are talking about or what type of name we are giving them, functional, nonfunctional or maybe even dysfunctional. It’s hard to find out what our customers want, then figuring out from what they say they want and they actually need. It’s hard to write it well and keep it up to date. Just to clarify, when we talk about a customer, that may be an internal or external client or group that is generating the project request.

It’s difficult to make sure that everyone shares a common vision of this thing we are trying to produce. One key piece of it is determining if we have the right information from our gathering and elicitation steps. Then once we have all the information we can think about it and make sense of it as a project team and come up with the requirements that actually represent the solution we are going to be building and ultimately deploying. It sounds really straight forward, yet it's remarkably difficult to do it well.

Projects typically succeed or fail depending on how well people work together. When you lose sight of the importance of people issues, such as clarity of purpose, effective and efficient communications, and management support, then you are doomed to struggle. Engaged people find ways to work through all problems. The challenge of leaders is to create environments for people to do their best work.

On the information side of things there are two key components. First gathering the correct information. Second, making sense of the information and translating that into workable requirements with measurable deliverables. In the book “Effective Requirements Practices” by [Young R. Ralph \[2001\]](#), he goes on to say that the top three requirements issues project teams must overcome are, first a lack of joint responsibility between the project team and the customer for the project success. Second, the project team’s use of ineffective requirements and project management practices. And third, the requirements provided by the customer often not being the real requirements.

Another way to stream on our project is to make project information easy to find and share. Teamwork and collaboration are important in any context, digital or otherwise. Wharton’s [Adam Grant \[2013\]](#) says the single strongest predictor of a group’s effectiveness is the amount of help colleagues extend to each other in their reciprocal working arrangements. But collaborative cultures take on even greater importance as companies look to boost their Digital Quotient, since many lack the established digital

backbone needed to unify traditionally siloed parts of the organization, from customer service to fulfillment to supply-chain management to financial reporting.

In order to achieve effective collaboration among all engaging members we might set up shared folders on the company network or create an online group. In a large company we may have access to more sophisticated tools such as SharePoint, Project Server or Primavera applications. If we work with people in other locations or outside our organization, cloud-storage services make it easy to share information. Services work in different ways. With some we upload files to a shared area, others let us save files in a shared folder on our computer. The service takes care of uploading the files and synchronizing with shared folders on other people's computers.

Further up the food chain are online project management tools and online hosted project management environments. These cost a bit more than online storage but offer a lot of collaboration with team members. For example, these tools provide features for creating schedules, managing resources, tracking issues, managing time sheets and discussing topics online. With the right communication, the right people get the right information avoiding information overload.

7.2 DISCUSSING THE ELICITATION PROCESS

The elicitation process is done at business and user level. Elicitation is a human based activity which means it's open to errors and misunderstanding as well as forgetfulness. If the elicitor does not have a well-documented plan in advance it can be easy to miss important details. Four things to consider here are the determination of requirements sources and the way of gathering information and from whom. We have to involve research, reading, talking and observing and encompass organizing and evaluating our research results.

Let's say we decide we are going to gather information through use of questions. We should think of the types of questions we will ask. There are many types of questions to consider. Research questions often start out as general questions inviting users to provide information about their concerns, interests and needs to assist in scoping out what is needed. They don't need to be limited or specific and the answers are not controlled in any way. Examples of research questions might be "what constitutes success for this project", "what would happen if this process no longer worked" or "what concerns do you have about these proposed changes".

Detailed questions target more specific information within the predefined project scope or other limits. This is typically the step after research questions focusing the business analyst or project team member gathering requirements on more specific requirements. One technique is to frame these types of questions around the five Ws of project management (Who, What, Where, When, Why). Examples of detailed questions include "why is there an inventory problem", "who provides you with this information" or "where do you send this information and why".

Directive questions are used primarily in group settings or where there are contradictions in what the business analyst or project group member has been told. The goal is to reach consensus on specific features and functionalities while encouraging group decision making. Examples of directive questions on a software

project might include “do you like this data-entry-screen format and interaction”, “what three errors are most significant in this scenario” or “what is the relative priority of this key feature”.

Meta questions are used to clarify and summarize what we have been told so far. Essentially these are questions about questions. They allow you to promote open communication in a nonthreatening way and prove that we’ve been listening. Examples of meta questions might be “do you mind if I ask you about...”, “are there any areas I’ve missed” or “would you clarify what you told me”.

And of course there are always the open-ended questions like “what concerns do you have about the proposed new features”, “from your perspective what is the main reason for this project”, “what constraints do you see relative to this project” or “what your tradeoff between time and value is”. Versus closed-ended questions looking for a yes or no, ranged scale response or multiple choice. An example would be “what is your preferred method for purchasing books” with multiple answers to choose from (a) over the internet, (b) in a bookstore, (c) from an individual, (d) all of the above, (e) none of the above.

Whatever style we choose to use in our questions we should use natural and familiar language, business level technology rather than technical terms. We must be prepared before asking these questions by doing research on the regulatory aspect of these questions as well as the cost comparison data. Some things we must keep in mind during the requirements collection process is avoiding expressing emotion and opinion, making each question simple and clear, knowing why we are asking each question and writing our questions down before asking them. And the three questions we should ask our stakeholders before we are done might be “is there anyone else I should speak with”, “do you have any questions for me” or “is there anything I missed or need to know”.

Apart from the preparation everyone recognizes the power and need of data visualization in this era of Big Data. Spreadsheets are good for compiling data, but not so great at representing what it all means. But take the data and turn it into a chart or graph, and patterns begin to emerge that make it possible communicate its significance, draw conclusions and make decisions. Effectively visualizing information makes complex data more accessible, understandable and usable. Project managers also benefit from applying visualization to the type of data they work with. Project descriptions, goals, priorities, resources, tasks and timelines are much easier to communicate visually. Mind mapping software (also called information mapping) can help project managers create views of this project information in a way that is easier to understand and more actionable [[Heredia, 2015](#)].

We can think of mind maps as virtual whiteboards. Starting with a blank mapping “canvas”, it’s easy to quickly gather ideas and information and then drag and drop to create structure. Mind maps as shown in figure 7.1 allow users to arrange information in diagrams that help everyone involved see the relationships between concepts and how they fit into the scope of work. Information can be arranged in spider diagrams, organization chart format, tree diagrams, and other frameworks useful for displaying information in a hierarchical manner. As a means to structure and communicate the complexity of a project, it’s an ideal approach that allows project managers and their teams to clearly see the bigger picture and then drill down to view details in context. In the next few paragraphs, we’ll look at requirements management process and

describe how using visual project plans and dashboards can make the difference between success and failure.



Figure 7.1: Mind map as virtual whiteboard [Heredia, 2015]

7.3 VISUALIZATION OF REQUIREMENTS MANAGEMENT

While many experts agree that achieving upfront agreement on project deliverables and scope is key to project success, it can be very difficult to accomplish. Typically, a slide deck describing project goals and priorities is sent around by email with a request for comments. The response rate is generally low and comments are vague. Management of requirements and validation can't be done over email because accountability is limited and nobody can see the cascading impact of changes. To address this, mind maps can be used in a series of workshops (live or online), where participants can contribute and comment on the problems to be solved, goals to be accomplished, and priorities for resource allocation.

We will use brainstorming to help generate group requirements right up front in a project. A mind map is the perfect tool for requirements gathering through brainstorming process, because participation and the ability for everyone to see all changes are critical. By creating and sharing a visual map of the discussions, everyone can see the implications of recommendations and decisions on priorities. After live sessions, the map can be immediately distributed, without the project manager having to transcribe notes.

To get the most out of brainstorming sessions we have to be aware that there are two phases to it. The first phase of brainstorming is coming up with the ideas and topics we want to cover. This is also known as **divergent thinking** [Pham, 2012] – it's when we are free flowing and not thinking about what is good, bad or semantically correct. There are no relationships or connections between our thoughts. They are just there – we are simply dumping our thoughts without any judgment. It's when we are thinking outside the box and we are not confined to a set of rules or framework. This

is like being a little kid that doesn't understand how the world works – it will just do whatever it is thinking without any limits and that is exactly how we want to think.

The second phase of effective brainstorming is when we are **convergent thinking** [Pham, 2012] – we have set of rules and trying to find the best solution(s) with what we have. Unlike divergent thinking, where we are thinking outside the box, convergent thinking is like thinking inside the box – we work with what we have. This is the phase where we start to organize our thoughts, structure them and work on finding a solution with the tangibles that we have. To finish the kid analogy, this phase is where we have grown up to become an adult, we have learned the rules and we now start to play with what we have within a set of rules and regulations.

First we have to define what problem we are trying to solve, how we are going to solve the problem and have to think what the key steps to have the problem solved are. Assuming that we have problem with the “customer relationship management software” in our organization. We installed it a few months ago and doesn't go well. Let's actually define what the problem is, what exactly is happening and how we can solve it. This is where we can have a meeting in person, have everybody in a conference room or we can do it through Mindjet. Project manager can be the person entering the information in the map. Doing that we can have the map stored in a cloud (figure 7.2). We can actually share the map with other people and have them going actively on what we call coediting. We could use the “share” button as shown in figure 7.3 and share it with people in our company or outside the company, simply by entering their email address, first and last name. Once they come into the map through mapping client, we see them in Mindjet's webpage in the upper right corner. And they now can add information inside the map themselves.

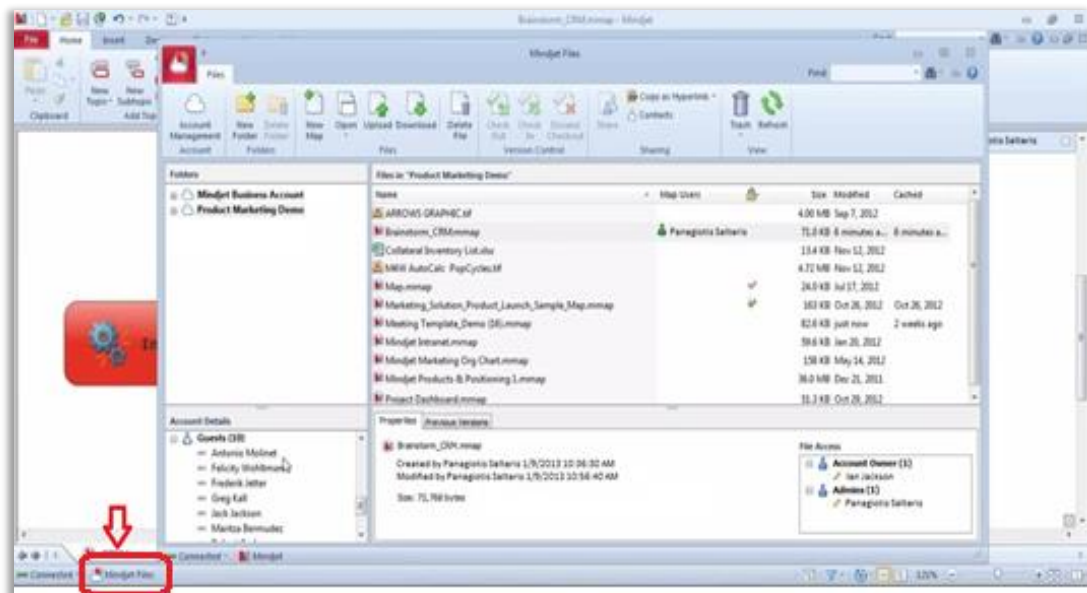


Figure 7.2: Snapshot from Brainstorm_CRM session (cloud) [Miller, 2013]



Figure 7.3: Snapshot from Brainstorm_CRM session (sharing with stakeholders)
[Miller, 2013]

Having defined the problem we conclude that sales representatives don't use the CRM tool leading to several problems. We have also agreed that the two main causes for the malfunction of the system are the poor sales forecasting and the poor customer data for marketing department. So we turn these around into positive goals we want to achieve for this new project. At this phase we will try and find out how we are going to reach these goals. Understanding the goal of a project is crucial whether the project is small or large. Focusing on the goal keeps the project headed in the right direction from start to finish. At the very beginning the project goal helps to decide whether or not to undertake the project. Once the project starts the goal helps everyone focus on achieving the right results. At the end the goal helps you decide what the project we have accomplished is set out to do.

The organizational goals and objectives are an important input at this phase, as project goals and objectives should align with the organizational ones. Goals and objectives that are relevant to the situation provide the context and direction for any change or solution that addresses the business need. Business requirements are goals, objectives, and higher-level need of the organization that provide the rationale for why a project is being undertaken.

Three questions help clarify the goal. The first question is "what problem are we trying to solve". The second question is "what results should the project deliver". To ensure success we want to identify these results upfront. These results might spot like detailed objectives for the project. And we can ask a third question to confirm the goal, "are these the right results?". We must make the goals specific and describe the goals, objectives and results in ways that are quantifiable and measurable.

Different people might have different perspectives of a project goal. If we run into this situation the quickest resolution is to hold immediately a meeting with the project customer and other interested parties to hash out the answer. We are then going to ask everyone what they think the goal is, facilitate the discussion, help people see

where they agree and finally wrap up by stating the goal if it's been revised. The goal must be documented so as we can revisit it throughout the project to stay on target. People will read this during the setup and subconsciously start thinking of ideas.

So now we can just start typing our suggestions in the white blank space of mind map surrounding our topic. Anyone of the participants can do that. Anytime we click anywhere on the mind map we can create a floating topic by just typing our keywords. The idea is that we want to capture as many thoughts as possible. We don't need to worry about semantics or if our thought makes any sense – we will just note it down in a floating topic. This mimics the flow of how we would do it with pen and paper – we just add keywords all over our paper surrounding our idea. We want to do the same on our mind map. Below we will see an example of how this looks like where an example of phase one of brainstorming took place.

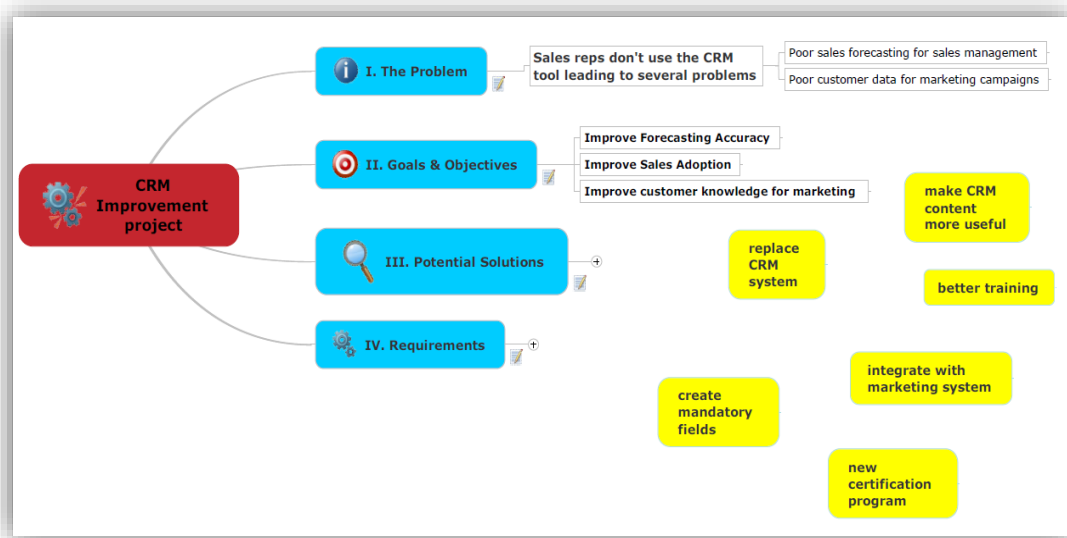


Figure 7.4: Divergent thinking of brainstorming session [Miller, 2013]

There is a second option of conducting guided brainstorming through Mindjet using the "Brainstorming tool". We can clarify the brainstorming by adding our own questions or using the pre-defined questions from the tool. If we run out of ideas there is a possibility of using idea flash cards. In this way we use some images, words and questions to trigger to new directions and help us think about that specific challenge in a fresh way. If we have some specific words or images we would like to use, those cards can be tailored. We can create a whole new deck specialized and tailored to our own organization.

After we are done coming up with ideas, it's time to organize our mind map. The best way to organize this is to start grouping floating topics together under a branch. What we are going to do is take all this free flow of information during the more generalized brainstorming session and organize them into branches such as "CRM enhancement", "training" and "integration" and prioritize them later on. We can simply drop the ideas in our map embodying them in our potential solutions. Another way to categorize ideas is through the branches "do it!", "investigate", "save" or "trash" of Mindjet. We can even proceed to ideas refinement expanding each idea topic with topics such as what's new about this idea, benefits, values, assumptions, pros and cons.

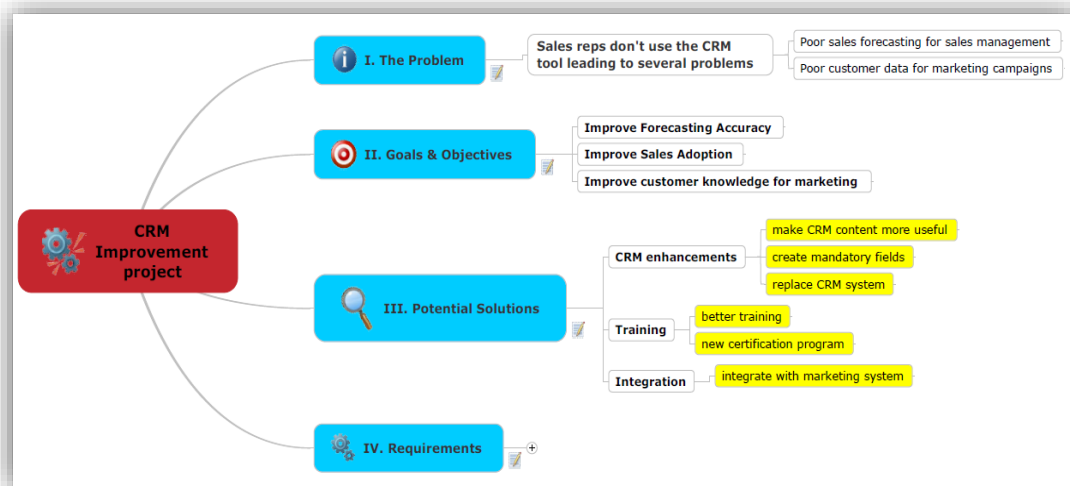


Figure 7.5: Categorization and refinement of ideas [Miller, 2013]

Now we can pull back and do a much more detailed requirements generation session. As we know the key problem we are trying to solve, what the goals are and some of the potential solutions, as we go in and gather requirements from various different groups, it's much more focused than what we were doing earlier. It's like we go for a second round of brainstorming but this time requirements must be more accurate and include more quantitated data. These are agreed upon as the key requirements that are going to drive our project.

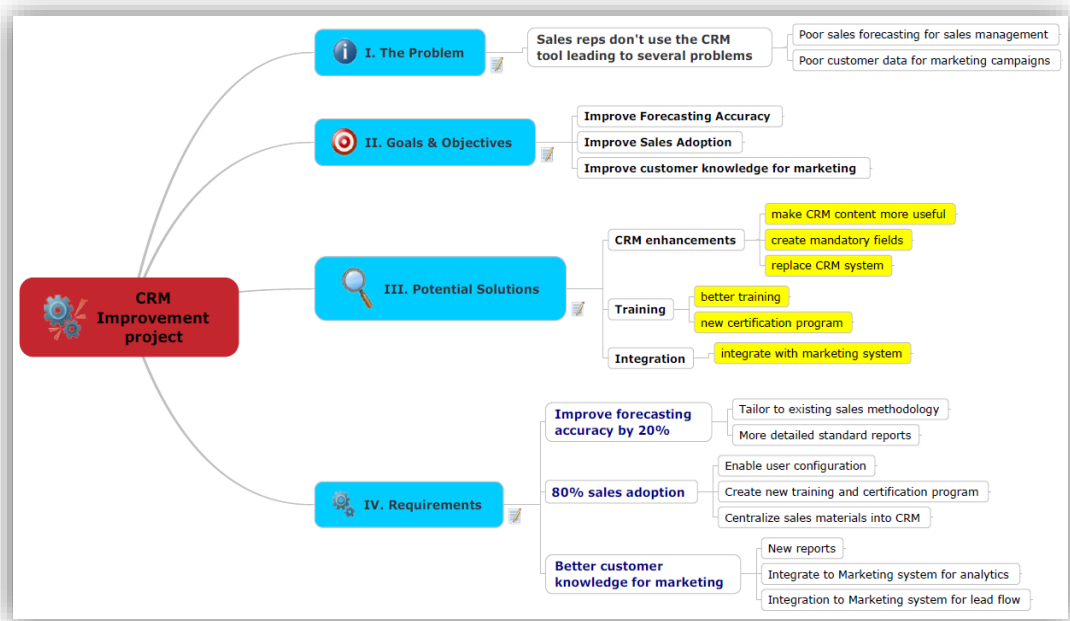


Figure 7.6: More specific requirements [Miller, 2013]

Then we are going to do a series of offline interviews with people and try to capture the information associated with quantity inside the map itself. This offline requirements gathering process could actually take a couple of weeks but we are going to put them

in a separate document (requirements questionnaire) that we are going to bring in touch with people from different backgrounds (e.g. marketing, IT engineering). As we distribute the map after we have finalized it people can dive down to whatever level of information they want. We have gathered a tone of different requirements and now we are going to start breaking them.

So we have created a map to present to our senior management or to the sales management. We have reached out all the people involved and we are putting them in a single sort of information. When we close all tabs we can use it as the project dashboard as we move through the planning phase. Furthermore we can distribute the map to more people who need to see that and as soon as we take their approval we can start generating much more detailed planning information.

7.4 MAKE THINGS MORE SPECIFIC

When constraints such as time and money limit what we can accomplish, the categorization and priority of each idea is very important. When we have generated a great bunch of ideas, we will want to determine the relative importance of each requirement, decide which requirements need more analysis to best understand their priority and look at which requirements should be implemented first. In Mindjet, the “yes” flag is used for example if we all agree we have to do something about it. We can even use the “defer” flag although we don’t agree with that, but we could use as a proposed potential solution. Prioritization of requirements assists with this decision making. In order to prioritize our requirements we will need to decide with the assistance of our stakeholders what requirements are must-haves, what requirements are good-to-haves and what requirements are like-to-haves. Once we have flagged the ideas our mind map will look like the one shown in figure 7.7.

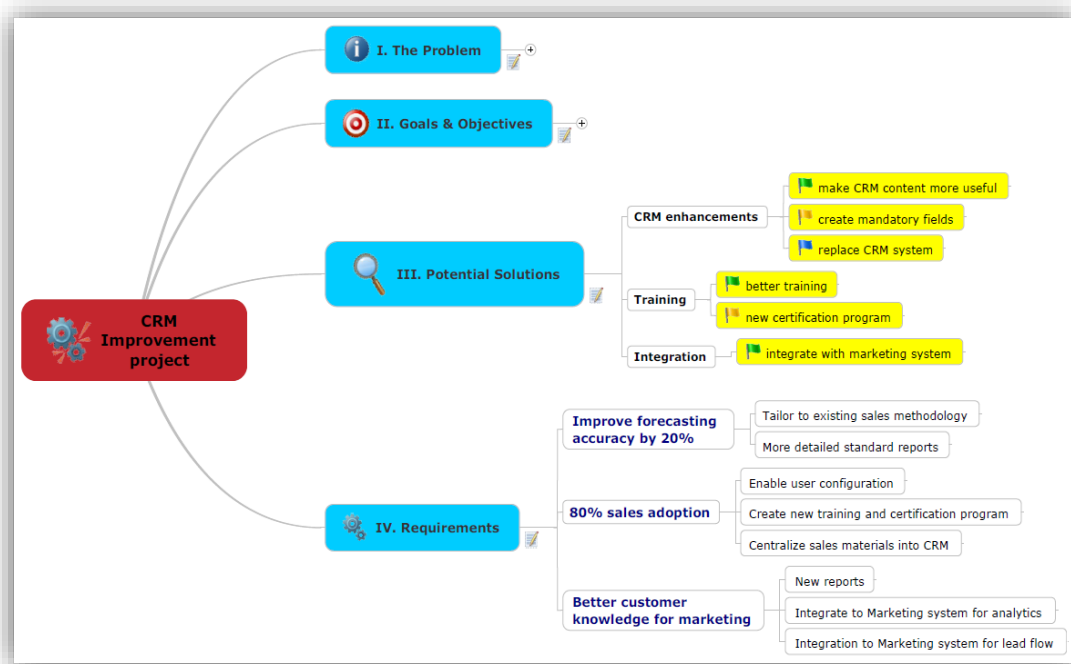


Figure 7.7: Flagged ideas [Miller, 2013]

Requirements are ultimately constrained by budgets and schedules, so we will need to get the trade-offs in desired functionality to meet these constraints. Prioritization of requirements assists with this decision making. In order to prioritize our requirements we will need to decide with the assistance of our stakeholders what requirements are must-haves, what requirements are good-to-haves and what requirements are like-to-haves.

There are several prioritization scales. Our first scale will sort requirements by high, medium or low, where high means this requirement must be included in the next release. A medium requirement means this requirement must be included but can wait for a later release. And a requirement ranked as low would be nice to have if we fit it in. Our next scale will sort requirements as necessary, important or desirable. Here necessary means that this requirement is mission critical. A requirement ranked as important supports necessary system operations and a desirable requirement provides functional, quality or usability enhancement. A third model will sort requirements by essential, conditional or optional. In this model essential means that the product, service or result is not acceptable without this requirement. Conditional applied to a requirement enhances the final product but is not unacceptable if absent. If a requirement is marked optional, that represents functions that might or might not be worthwhile.

By the time we have finished with breakdown of the requirements, all of them seem to be equal but that's never realistic. The value of having priorities and dependencies clearly labeled during a project mapping session cannot be underestimated as a tool for driving commitment. A numbering system of 1-2-3 works well as it fits the scales mentioned above. Next, we will ask all stakeholders to classify the requirements by priority, which should be an informal sorting process. The purpose of the prioritization process is getting a relative sense of each requirement's priority. A review of the solution's use cases or the product's operational scenarios helps stakeholders classify requirements. Often, it's easiest to identify 1's and 3's first and allow everything else to default to 2 [Bell, 2012].

Once everyone has had a chance to do their prioritization, the differences should be resolved. So we can go in and start putting colored coding in terms of prioritization and the mind map will be as shown in figure 7.8. And yet this is not brainstorming selection but this is making sure that we have gone through and have our finalization of the meeting priorities. We are going to gain agreement from the extended team including marketing team, IT team, sales team and everyone else who has been identified as key stakeholder. After we have a set of priorities, we will use them to create priority-based development schedules and show everyone where work begins and ends on each requirement.

Throughout the development effort, we must maintain the priorities. We don't finish with prioritization until we finish the last version of the product or implement the last phase of the project. We will go back to what we laid out in the mind mapping software and see where adjustments may need to be made along the way. We may find that tradeoffs will have to be made along the way during design and development of the solution to make sure that the priorities are still driving the effort on a realistic overall project schedule for the solution. When the customer brings new requirements (and they always do) that require deferring some old requirements, we will need to work with the team and customer to review and re-assess the priorities given to key requirements to be sure that the most important requirements are kept on the critical

path and the lesser prioritized functionalities are the ones pushed out or potentially discarded altogether.

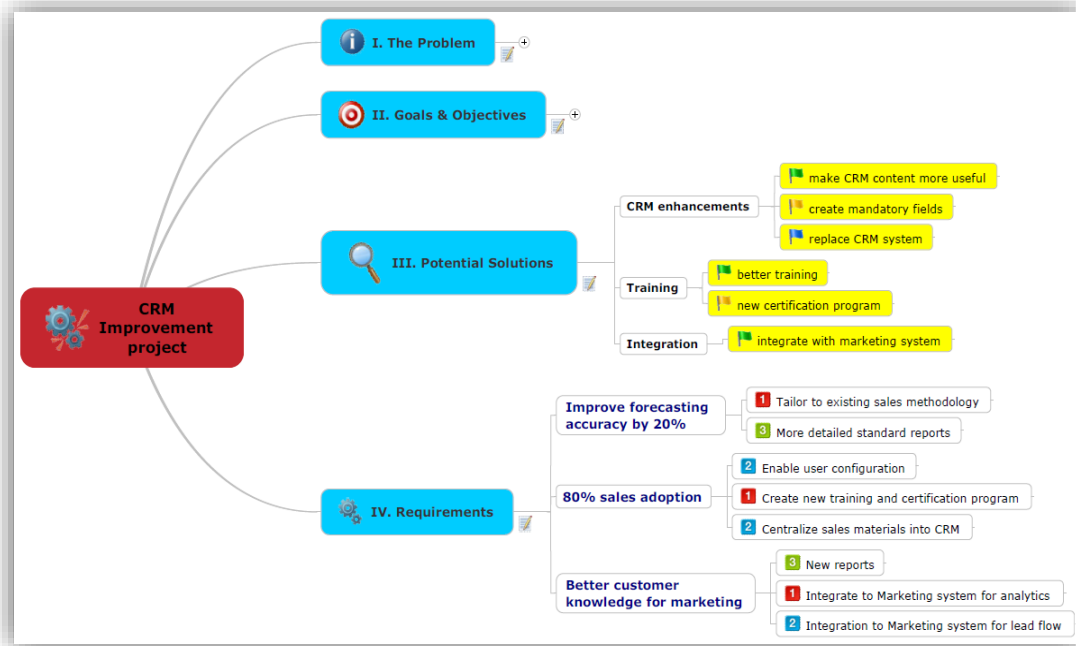


Figure 7.8: Requirements prioritization [Miller, 2013]

If we prefer a mathematical approach we can estimate the relative value of each requirement by first creating a ranking scale such as 1 to 9, with 1 being low and 9 representing a high value. Then we or a subject matter expert will estimate the relative benefit and penalty for each feature. Then the sum of benefits and penalties reveals the relative value. Once we have all the summations we can calculate the percent of total value from each feature.

Having prioritized our requirements we will use modeling techniques which will allow us to simplify and focus on key areas. This helps make complex systems understandable while allowing to describe different perspectives through use of different model types. Modeling techniques can help facilitate communication with the stakeholders and help translate requirements into design solutions.

The business-domain model is a high-level description of the as-is condition of our scenario. As well as this we can provide a high-level description of the proposed to-be solution, the envisioned outcome. The “gap” between as-is and to-be describes how much change will be needed to achieve the project solution. This helps define the boundaries of the solution model. This step usually takes place as a predecessor to detailed analysis.

Once we have the big picture we can begin the decomposition process. In decomposition we break high-level goals also known as business requirements into lower-level goals with measurable objectives, thus translating stakeholders’ requirements into solution design. Selecting the types of analysis models or models we use will be depending on our organization or client and how they typically use information. We will have a quick look at three of the most popular models, data and behavior models, process flow models and usage models.

If we are data driven or data drive how things work in the output of final solution, then we should pick a model that supports that. Examples include use of business rules and data dictionaries. In process driven model it's really saying over the time sequence of events what happens inside the solution as we step through and do things. This is more traditional using flowcharts and decision flows. Examples include data-flow diagrams and flowcharts. With usage model we model the static data and the dynamic process together. Then we document how the users are interacting with the data and the process together. Examples include use cases, prototypes and storyboards.

The goal by the time we have everything broken down and analyzed is to have clearly written, measurable requirements for our project. If, for example, we are going to build a garden for our backyard one of the written requirements states that the garden shall occupy a 9 meters by 12 meters area. That's a nice clear requirement in terms of size. Adding clarity about the exact location would make it a better written requirement. Another requirement states the garden may include a 1 meter by 3 meters rock wall. Now this requirement needs some improving. Will the wall be 1 or 3 meters high? Will the wall be included or not? Focus words such as "shall" and "will" leave no room for doubt where "may" leaves room for interpretation. Better to be crystal clear in our requirements document rather than leaving it to chance.

Having finished with the collect requirements process attributes associated with each requirement can be recorded in the requirements traceability matrix. The requirements traceability matrix is a grid that links product requirements from their origin to the deliverables that satisfy them. The implementation of a requirements traceability matrix helps ensure that each requirement adds business value by linking it to the business and project objectives. It provides a means to track requirements throughout the project life cycle, helping to ensure that requirements approved in the requirements documentation are delivered at the end of the project. Finally, it provides a structure for managing changes to the product scope.

Attributes associated with each requirement help to define key information about the requirement. Typical attributes used in the requirements traceability matrix may include: a unique identifier, a textual description of the requirement, the rationale for inclusion, owner, source, priority, version, current status (such as active, cancelled, deferred, added, approved, assigned, completed), and status date. Additional attributes to ensure that the requirement has met stakeholders' satisfaction may include stability, complexity, and acceptance criteria. Figure 7.9 provides an example of a requirements traceability matrix with its associated attributes.

A formal traceability matrix is usually built hierarchically; therefore, it provides for the evaluation of each new requirement. High-level requirements are evaluated to ensure alignment with their source. As high-level requirements are defined, these are included on the traceability matrix and traced to the business need, project objectives and business goals. As lower-level requirements are defined, these are evaluated against the higher-level requirements for alignment. The lower-level requirements expand on the details articulated in the high-level requirements, and the progression is displayed easily on the traceability matrix. The matrix also helps to evaluate new requirements against associated high-level and lower-level requirements when they are added to ensure alignment in all directions [PMI-BAP, 2015].

Some organizations develop a traceability matrix template as a starting point. During business analysis planning, the business analyst collaborates with the project manager and business stakeholders to determine which components of the template are to be used during the project, which components complete the matrix, and at what point during business analysis is traceability considered to be complete.

REQUIREMENTS TRACEABILITY MATRIX								
Project Name:								
Cost Center:								
Project Description:								
ID	Associate ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverables	Product Design	Product Development	Test Cases
1	1.0							
	1.1							
	1.2							
	1.2.1							
2	2.0							
	2.1							
	2.1.1							
3	3.0							
	3.1							
	3.2							
4	4.0							
5	5.0							

Figure 7.9: Example of Requirements Traceability Matrix [adapted from the PMBOK, 2013]

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CHAPTER 8: STAKEHOLDER ENGAGEMENT AND CONTROL

8.1 MANAGE STAKEHOLDER ENGAGEMENT

Organizations can no longer choose if they want to engage with stakeholders or not; the only decision they need to take is when and how successfully to engage. Stakeholder engagement is premised on the notion that 'those groups who can affect or are affected by the achievements of an organization's purpose' should be given the opportunity to comment and input into the development of decisions that affect them. In today's society, if they are not actively sought out, sooner or later they may demand to be consulted.

Engagement should be regarded as any other business project planning process, with adequate analysis, preparation, implementation, reporting, evaluation and follow up. The ideal stakeholder engagement process should be an iterative process, allowing engagement to benefit from diligent planning, thorough reporting and the application of learning as a result of appropriate evaluation and monitoring.

Manage Stakeholder Engagement is the process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle. Engagement with stakeholders has the possibility of securing a wide range of benefits for our organization, from protecting the organization's license to operate to gathering information on improved market or product performance. Done well, it can even lead to the development of new products and services. However, if an engagement process is poorly managed, it has the potential to undermine stakeholder relations resulting in mistrust and tension, as well as making the possibilities for future successful relations much more difficult. The inputs, tools and techniques, and outputs of this process are depicted in Figure 8.1.

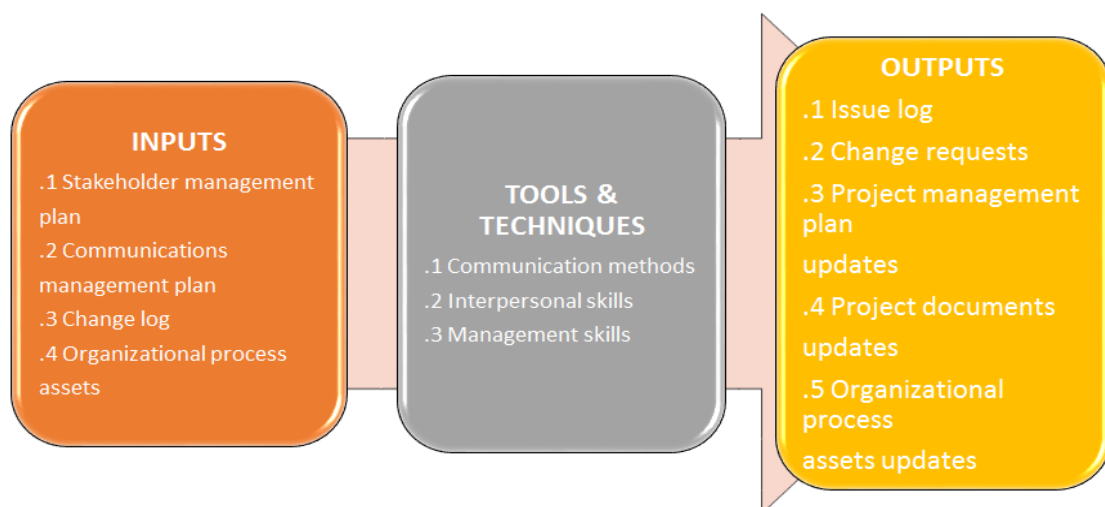


Figure 8.1: Manage Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs
[adapted from the PMBOK, 2013]

In order to achieve effective stakeholder engagement communication plays an important role. Good communication is a big part of making a project a success. It helps work flow more smoothly and can prevent or reduce problems. On small projects we need the right people getting the right information with a minimum effort. First we shall consider who need information about the project. With a small team we know we will communicate with the customer and the people who do the work. Then we think about other people or groups that might need to be on the know. Second we should think about who needs to know what about the project. Third we need to decide how to distribute information to people, how often we communicate, the method we use to send information and the format we use.

A lot of times the project customer gets information more frequently with more emphasis on project performance but with fewer details. A good way to find out our customer's communication preferences is to put together a sample message or report and ask for feedback. After we work out the content, frequency and format, we can use that sample as a template for future communication.

If we get resources from other managers, we first tell them the skills we need for the work and when we need people. Once team members are on board we will want to let the managers know when assignments change such as finish dates delaying or the number of hours increasing. Our team members need to know what they are supposed to do and when they are supposed to do it. They also need to know about changes, issues and resolutions that affect them. So a change log must always be available to document changes that occur during a project. These changes and their impact to the project in terms of time, cost, and risk, are communicated to the appropriate stakeholders. Rejected change requests are also captured in the change log.

We don't have to plan communication with each individual on our team. We can create groups from our team members who have the same communication needs and add the groups to our communication management plan. How we distribute information depends on our environment and how people like to work. However some methods are better than other in certain situations. Face-to-face communication is good for discussing sensitive topics, brainstorming solutions to problems and building relationships with people. If we can make video calls these are almost as good as being there. Phone calls are the next best thing but we can't see facial expressions or body language. These days email represents a lot of the communication that occurs. We should send emails to people who need the information and not to everyone on the project. When we reply to messages, we should reply only to people who really need to know or ask to be included to the discussion. The development of an effective communications management plan is an important part of making a project to run smoothly.

Mature project managers have a vast array of management skills they have built over the course of their career and they use to communicate with and engage stakeholders at appropriate project stages to obtain or confirm their continued commitment to the success of the project. Those that will probably help us the most in managing and engaging stakeholders include facilitation skills, the ability to influence people, the negotiation ability and flexibility and the talent in getting people to accept the change the project is creating.

In case of over allocation the project manager will need to facilitate the conversation with management to clearly prioritize the projects within the current work stream and influence the outcome of that conversation to vote his project at top priority. Once the priority is secured the project manager will need to negotiate with the functional manager to consider augmenting his staff the contractor pool to meet the project's deadlines or negotiate with key stakeholders to modify the project schedule to accept delays if contractor's staff is not added.

If the key stakeholders have already agreed to the top priority our project holds, the project manager will need to apply strong influence to gain the added staff to keep the project on track. The alternative extended schedule is the worst case option that we all know the organization will want to avoid. To be successful, the project manager must encourage key stakeholders to actively participate in events rather than merely attending. Otherwise our project could be at risk of slipping the schedule. Once the project manager has their attention he will need to facilitate the dialogue to assure acquisition of the needed resources. He may also need to meet with some of the key stakeholders before the meeting to build the coalition and gain support during the group discussion about the project priority and need for additional resources.

Once the group is in agreement that the schedule must not be delayed and they agree to augment the existing team with some contract resources we will want to make certain we capture that decision in the meeting minutes. After that we need to update project documentation with that agreed change getting proper signature where required to make the change official and secure victory and maintain our current schedule averting potential delays. Firmly yet appropriately applying our management skills throughout the project will help us gain stakeholder respect and support critical to the success of our project.

Apart from the management skills the project manager applies to coordinate and harmonize the group toward accomplishing the project objectives, there are many interpersonal skills project managers might apply during a project. Let's take a moment and look at a few interpersonal skills that can help us while engaging with our stakeholders. We need to have a good understanding of communication methods available to us and the awareness of the best method for key stakeholders given their own unique personality and positional power within the organization.

There are many personality profile tools available to help organization improve communications. One of the most popular profiles available in the marketplace today is called DISC personality profile. In this profile there are four main dimensions of behavior. Understanding a stakeholder's primary orientation within this model can help guide us in the best communication and conflict resolution approach to take with that individual for ultimate success.

As shown in figure 8.1 dominant individuals tend to be direct, results-oriented, firm, strong-willed and forceful. Influencers tend to be outgoing, enthusiastic, optimistic, high-spirited and lively. Steady stakeholders tend to be even tempered, accommodating, patient, humble and tactful. Conscientious team members and or stakeholders tend to be analytical, reserved, and systematic, with emphasis on quality and accuracy. Once we understand our own behavioral style and learn to recognize

other people's styles, we can adopt to more closely emulate the other person's style [Rohm, 1994].

Our natural tendency is to communicate with people the way we like others to communicate with us. However we don't all like one respond to the same approach. Knowing someone's predominant personality through a tool like this can help us form the best interpersonal approach and strategy that will work well with that person's temperament. It's like swimming with the current at the ocean rather than fighting against the waves. Progress is made more quickly and with less effort gaining alliance and resolving issues.

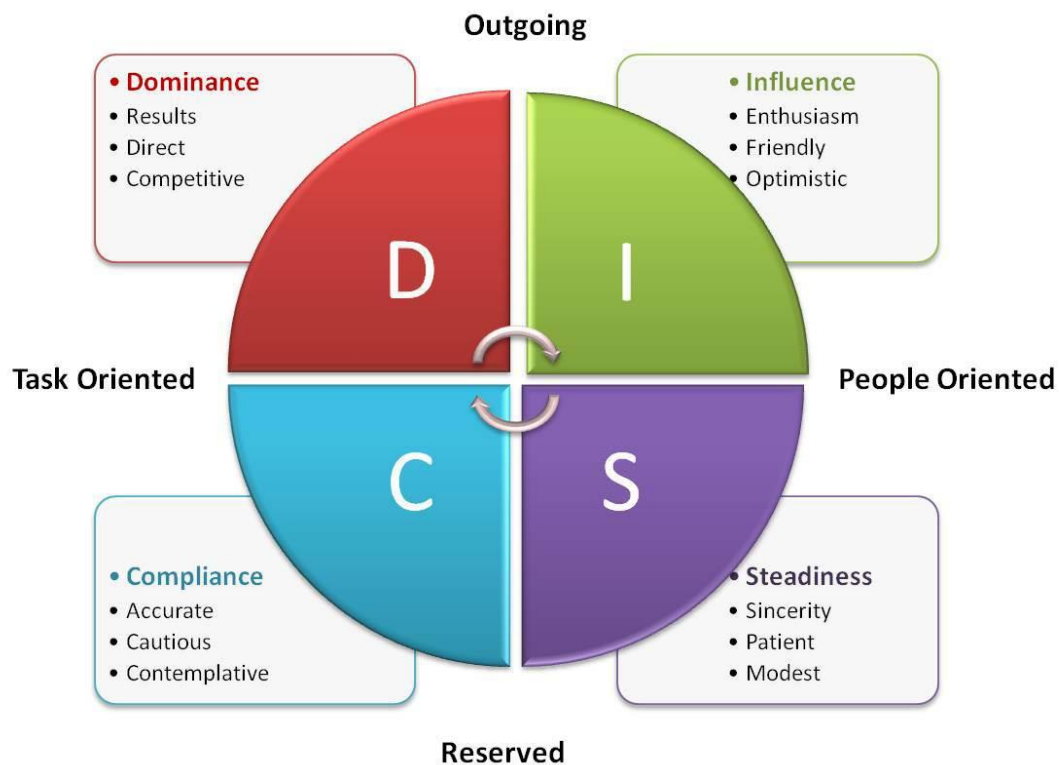


Figure 8.2: A snapshot of the four basic DISC profiles [Rohm, 1994].

If we try to influence a dominant person's decision to add contract or staff to stay on schedule by bombarding him with detailed, lengthy reports for him to analyze and evaluate, we would probably get resistance. That approach would work better on a C or conscientious team member. Dominant team members want us to be brief, be brilliant and be gone. Providing dominant people with a one-sheet, fact-based document along with very clear, forceful statement about importance of on-time delivery would be a much better stakeholder strategy to engage and align them with our desired course of action. That's also in the best interest of the project and organization's goals.

Finding the right stakeholder with a tool like this will show that we have been actively listening to our stakeholders and help us build trust, manage conflict and communicate most effectively with each individual stakeholder. Implementing stakeholder engagement strategies is not just for the project manager though. When our key team members and our coalition of leaders all work together, apply solid management and interpersonal skills along with clear communication techniques, will get our best results.

8.2 REQUIREMENTS VALIDATION AND CHANGE CONTROL

Once we have verified the requirements we will now validate them. The reason why we validate requirements is to make sure that every requirement meets a stated stakeholder need as well as provides value to the business while fulfilling goals and objectives set for our project. During validation we can also resolve any issues that might be identified such as incomplete requirements, missing information, ambiguous content, unrealistic or conflicting requirements while also allowing an opportunity to add clarification before moving forward.

There are many different types of reviews that can be done. We can for example conduct a static confirmation technique. Static confirmation requirements documents can be done in meetings or with individuals assigned to conduct the reviews. This technique begins early in the life cycle of the project before physical work begins. Typically we will have two types of static confirmation, pre-reviews of requirements and technical reviews where people analyze and discuss specific documents.

Requirements pre-reviews provide a cost effective process where a subject-matter expert (SME) checks the document and look for straightforward problems, such as missing requirements and graphical errors. When this person is done, this document is returned for correction or distribution to other reviewers. In a technical requirement review we generally have groups of people read and analyze documented requirements, looking for problems and then agreeing on actions to address the problem.

When we conduct a technical review we want to involve a number of stakeholders drawn from different backgrounds. People from different backgrounds bring different skills and knowledge to the review. Stakeholders feel involved in the process and develop an understanding and appreciation of the needs of other stakeholders. Our review team should always involve at least a domain expert and an end user. This team is checking for how understandable the document is, how complete, consistent and ambiguous the content appears and whether the content conforms to any known organizational procedures. The team can also confirm the traceability of content in this requirement document to other documents that complete the requirements package.

Our team may want to work from validation checklist. For example we may want to make certain our team answers all the following questions and document the results:

- Is each requirement uniquely identified?
- Are specialized terms defined in the glossary?
- Does a requirement stand on its own or do we have to examine other requirements to understand what it means?
- Do individual requirements use the terms consistently?
- Is the same service requested in different requirements?
- Are there any contradictions in these requests?
- Are requirements references described elsewhere?
- Are related requirements grouped together?

We need to validate all our project requirements to confirm each requirement adds value and aligns with business goals and project objectives. If a requirement fails the business value test there will be no benefit to the organization so it's better to trim that requirement from final documentation. Having the requirements validated and documented we can go through the validate scope process. This process involves taking the deliverables which have been internally checked in control quality process to see whether they meet the customer's requirements, and then actually present them to the customer for formal acceptance.

Once the approval of a deliverable is formally declared, documentation should be generated to state acceptance of this fact. Sometimes confirmation of acceptance may need to be signed by both the sponsor and customer before formal compliance is granted. If a deliverable is not accepted then a formal document stating noncompliance should be produced instead. As shown in figure 8.3 if the deliverables are accepted, then the project continues as before; however, if the deliverables are not accepted, then change requests are generated which will bring the deliverables in line with the customer's requirements.

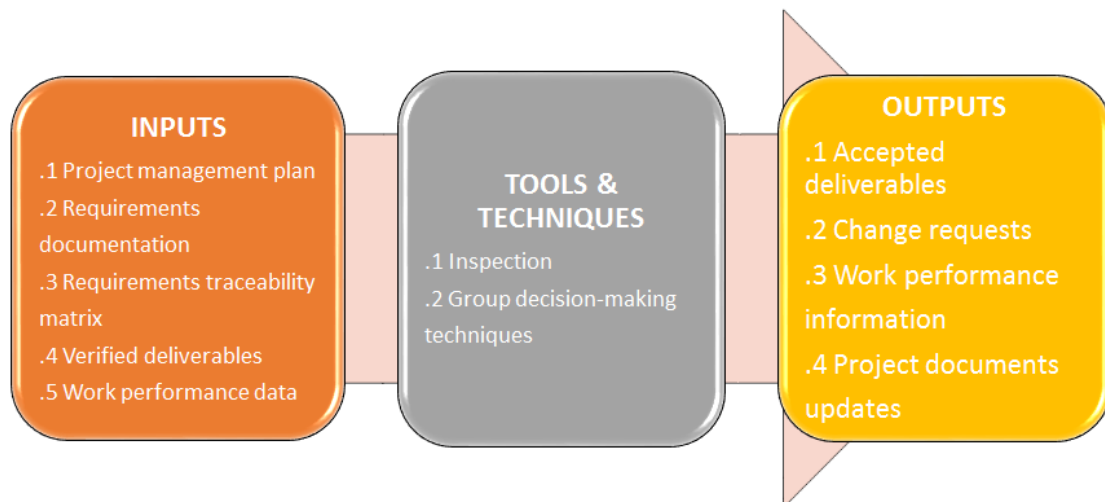


Figure 8.2: Validate Scope: Inputs, Tools & Techniques, and Outputs
[adapted from the PMBOK, 2013]

Managing changing requirements takes place across the project life cycle. Because of the adverse effect of changes on project costs and schedules, project managers traditionally try to resist changes. Disagreements between contractors, suppliers, project and functional managers, and customers over the necessity for changes and the impact of changes on the scope, cost, and schedule are common. Change management activities include planning our approach and process for change management, deciding on the use of requirements tools, planning and managing requirements traceability and then maintaining requirements for reuse. The key is being ready to recognize changing circumstances as our project life cycle proceeds.

As a whole the team's level of project knowledge improves as the project progresses, picking up on things that have changed or need to change. Yet the ability to respond to change decreases as the delivery date draws nearer. As shown in figure 8.3 the earlier we can recognize the need for change the more efficient and cost effective we can be.

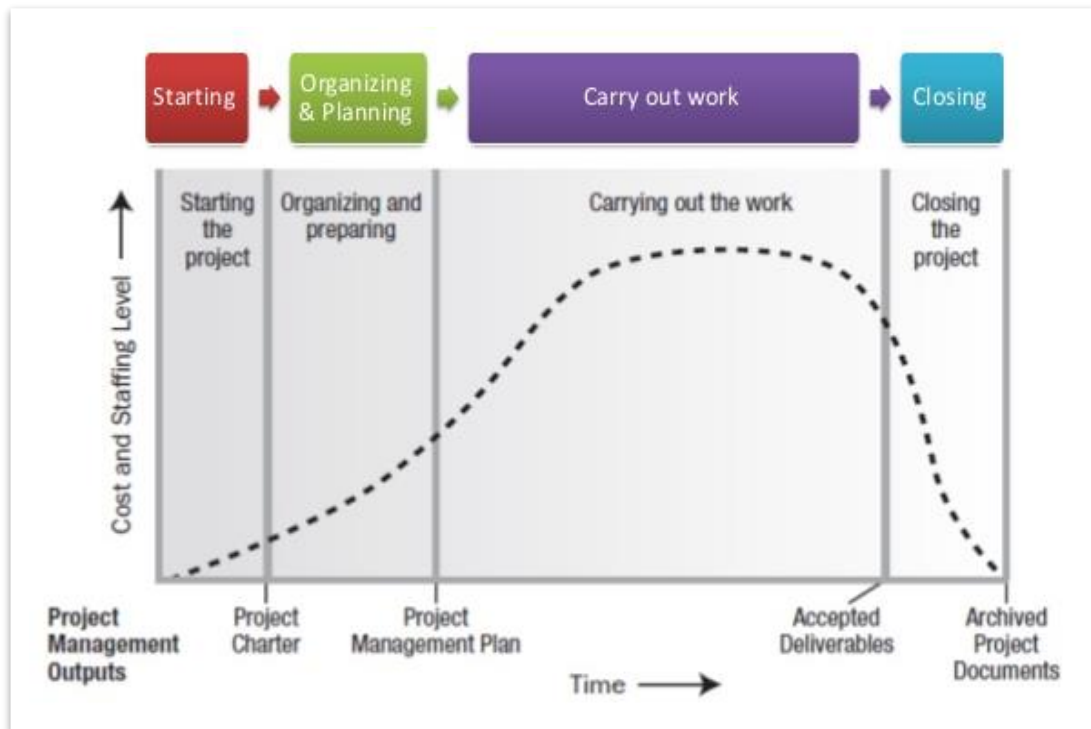


Figure 8.3: Typical Cost and Staffing Levels across a Generic Project Life Cycle Structure
 [adapted from the PMBOK, 2013]

We should also consider of what causes change. The further we get into the project the more interaction and information sharing will occur, helping us understand more and also allowing us to see conflicting requirements. Another cause may arise from a lack of traceability. Then we have customers and users who change their minds about what they need or developers who add their own special twists without letting anyone know. From the business perspective we may experience changes in business plans, budgets, timelines, conditions and objectives creating high level focus shifts. Or changes in technology, law, policies, regulations or directives tend to happen during every project.

Conflict between requirements or between stakeholders for the project may be challenging. We will need to accept that multiple stakeholders' interests and positions are legitimate. Yet there is no guarantee that everyone will get their own way. Such disagreements must be resolved by upper management and contracts renegotiated. The only way to reduce the number of changes and their negative impact on project budgets and schedules is to employ a formal change control system. Because changes are similar to other aspects of project work—i.e., they must be defined, scheduled, and budgeted—the process of drafting and implementing changes is similar to the project planning process.

The change control system includes a process to review all proposed design and work changes, weed out all but the necessary ones, and make sure that all related work is also reviewed, revised, and authorized. Within our change control process we will want to create some structure. We will have to create a formal change request template and have someone to research the change request. In addition we will need to categorize and prioritize the change requests once submitted. Finally our system will need to track those changes.

According to Harrison [1981], the system should:

1. Continually identify changes as they occur.
2. Reveal the consequences of changes in terms of impact on project costs, project duration, and other tasks.
3. Accept or reject proposed changes based upon analysis of impacts.
4. Communicate changes to all parties concerned.
5. Specify a policy for minimizing conflicts and resolving disputes.
6. Ensure that changes are implemented.
7. Report monthly a summary of all changes to date and their impact on the project.

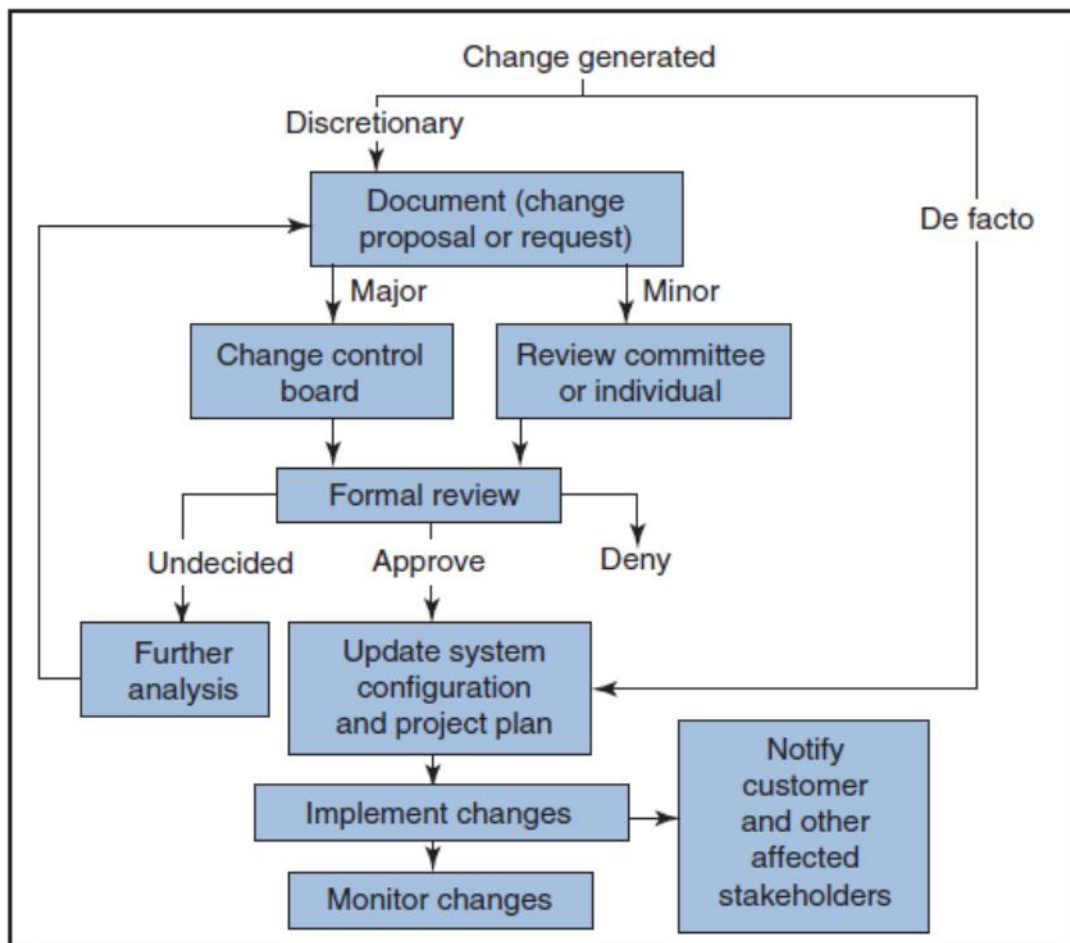


Figure 8.4: Change Control Process [Nicholas & Steyn, 2008]

Mature organizations tend to funnel all requirements and other change requests through a single point such as a change control board or project management office allowing for consistent control, evaluation and decision making. In large projects, the change board consists of the project manager and managers from engineering, manufacturing, purchasing, contract administration, the customer, and other areas, and meets weekly to review change requests [Nicholas & Steyn, 2008]. The effects of proposed changes are estimated prior to the meeting, at which time the board decides which changes to reject and which to accept. Any proposed or enacted change that impacts the time, cost, or nature of work of a single task or other related tasks must

be documented. Because everyone involved in the project has the potential to recognize or originate changes, everyone must be on the watch for changes and held accountable for bringing them to the attention of the project manager.

8.3 CONTROL STAKEHOLDER ENGAGEMENT

Our goal is to enhance organizational performance, create desired changes and sustain the outcomes. This process monitors the current engagement level of stakeholders and takes action if that level is not in line with the desired level of engagement at that point in the project. Engaging our stakeholders and gaining their support through communication, consultation and involvement will help ensure healthy project portfolio delivery.

Stakeholder briefings, communication of project milestones along with periodic pulse checks to measure the degree of buy-in and engagement are all good steps to implement throughout the project. An information management system provides a standard tool for the project manager to capture, store, and distribute information to stakeholders about the project cost, schedule progress, and performance. It also allows the project manager to consolidate reports from several systems and facilitate report distribution to the project stakeholders. Examples of distribution formats may include table reporting, spreadsheet analysis, and presentations. Graphical capabilities can be used to create visual representations of project performance information.

The key benefit of this process is that it will maintain or increase the efficiency and effectiveness of stakeholder engagement activities as the project evolves and its environment changes. Any issues or concerns can then be identified early and addressed properly. We want our approach to emphasize inclusivity and continuous stakeholder engagement. Engagement means to help build better relationships ultimately resulting in improved project initiation, planning, implementation, monitoring and closure.

If we have a large group of stakeholders, the typical approach includes pushing information to them through one way engagement or allowing them to pull information important to them from various channels such as websites, local media, letters, emails or brochures. When attempting to engage a wider group of stakeholders, two-way communication might be managed through surveys or town hall meeting. The more power, influence and interest the stakeholder group has the more interactive we want our engagement to be.

The next level up from our broad group of stakeholders may require consultation. This group may want to argue that they may not be responsible and not necessarily able to influence outside of their consultation area. Limited two-way engagement may occur here where the project manager, business analyst or task leader asks questions and documents subject matter expert stakeholders' answers. At the participant level of stakeholder our group again shrinks in size yet gains more power, interest and influence. This group is typically part of the team engaging and delivering tasks or with responsibilities for a particular activity or area. Two-way engagement will typically occur within the limits of the participants' area of responsibility.

Our top-level stakeholders will want to engage as partners sharing accountability and responsibility. Here we have two-way engagement, joint decision making and actions within the scope and limits of the project. Implementing the right stakeholder engagement strategy requires understanding each stakeholder's power, interest, influence and role and understanding what communication technique works best for that individual or group.

By establishing effective methods for measuring stakeholder satisfaction, project managers can measure how well stakeholders' expectations were addressed during the project as a measure of the project success. Three methods to consider are surveys, focus groups and interviews. Conducting online surveys to gather and measure stakeholder satisfaction with project progress or final outcomes first involves selecting a tool such as SurveyGizmo, SurveyMonkey or Zoomerang. Some of these tools are free, some charge a fee to create and execute your online survey and compile the results.

To design an effective survey the project manager should generate a shortlist of questions covering relevant areas he wishes to measure regarding project performance. For example it's usually the corporate training manager who leads all development of training materials, procedure manuals and quick help guides and the operations director is responsible for all operational activities related to the project. The operations director and his team will work closely to ensure that all environmental and occupational health and safety regulations are met and that all operations go smoothly for project implementation. The training manager will be tasked to create a training program that ensures the entire operations, contractor's and vendor's staff comply with all environmental and occupational health and safety regulations.

While response to the survey can be anonymous, role and responsibilities can still be captured. Then one of the survey questions might be "if someone during the course for this project, has completed the environmental and occupational health and safety program". For those providing a "yes" response the survey could direct them to additional enquiry to determine how the participant has felt about the training. We can build the survey to provide a menu of choices such as satisfaction rating scale including the options completely satisfied, satisfied, no opinion, dissatisfied and completely dissatisfied.

Then the project manager should provide clear instructions on how to complete the survey, when open feedback is requested and how the feedback will be used. This method of measuring stakeholder satisfaction allows project managers to create sophisticated charts of responses and analyze input to take decisive action. The number of stakeholders who were supposed to take the training can then be compared to the number who actually did. Then data can be gathered on any job related health and safety issues that occurred on sight during the project for a full analysis and determination of project success related to environmental and occupational health and safety.

Another set of measurements can be gathered by running focus groups. These facilitated discussions can cover topics like the quality of status reports, engagement strategies and project outcomes. Conducting an effective focus group usually involves comprehensive planning including setting an agenda, preparing specific questions to

ask stakeholders, encouraging collaboration and calling for action from participants. Project managers should encourage all participants to provide candid input reflecting their perspective. So the operations director might be asked detailed questions about his satisfaction with the project's health and safety statistics and training programs following a nominal group technique that confirms input from all stakeholders including her, since this was his area of responsibility.

Results can also be measured by interviewing stakeholders individually, which allows the project manager to gather feedback privately out of the public domain. That may occur if the information is sensitive, so we are not creating a bigger problem by discussing the sensitive information in a public forum. Top-level stakeholders may also appreciate this method as their schedules may not allow them to attend other meeting types.

Conducting surveys, meetings and interviews with stakeholders on a regular basis and at the conclusion of the project, helps increase the likelihood of success by providing the opportunity to gather lessons learned and allow us to make the necessary and desired improvements. In order for these to happen the project manager needs to watch the project and make sure the business analyst and rest of the team have a thorough list of stakeholders. The team and the growing list of stakeholders can help us continue to develop the list to make sure all stakeholders have been identified.

Control Stakeholder Engagement process results in the update and change of some important parts of the project life cycle, which are used back as input to other project processes. This demonstrates once the interactions between project phases and processes. As stakeholders engage with the project the overall effectiveness of the stakeholder management strategy can be evaluated. As needed changes in approach or strategy are identified, affected sections of the project management plan may need to be updated to reflect these changes (e.g. Requirements management plan, Scope management plan, Stakeholder management plan etc.). Moreover the Stakeholder register is updated as information on stakeholders change, when new stakeholders are identified, or if registered stakeholders are no longer involved in or impacted by the project, or other updates for specific stakeholders are required.

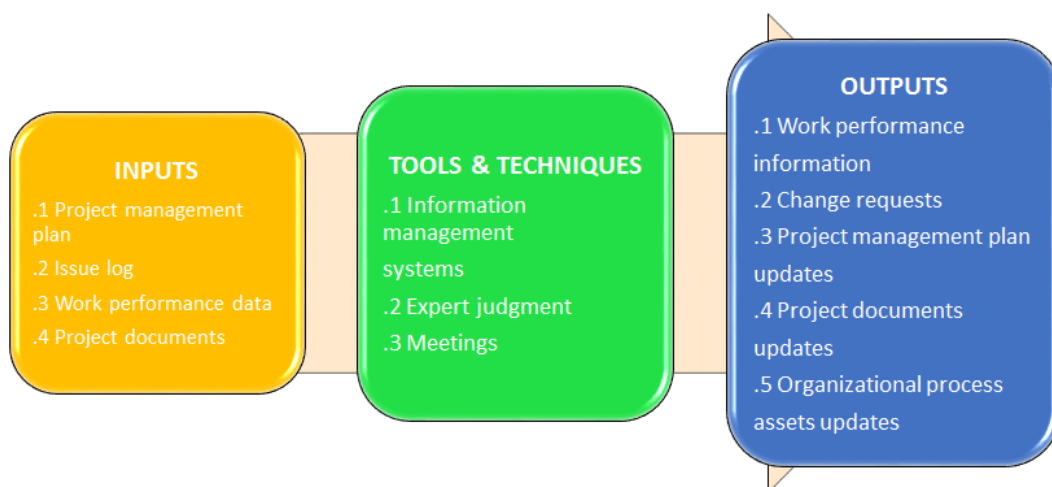


Figure 8.5: Control Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs
[adapted from the PMBOK, 2013]

To validate that we have a thorough list of stakeholders we can ask some of the following questions:

- Who has financial or emotional interest in the outcome of your work?
- Who might be positively or negatively impacted by the outcome of your project?
- Who are the clients or customers the output will serve?
- Who represents the governance and oversight for this project both internally and externally?
- Who are the service providers, suppliers of resources, consumables, equipment or components?
- Who will be jointly engaged in the execution of the project activities?
- Who's missing?

Once we have compiled the stakeholder list to complete our analysis of the stakeholders we can walk through this checklist and ask ourselves the following questions about each stakeholder:

- What financial or emotional interest do they have in the outcome of your work?
Is it positive or negative?
- What motivates them most of all?
- What information do they want from you?
- What is the best way of communicating your message to them?
- What is their current opinion of your work? Is it based on good information?
- Who influences their opinions generally, and who influences their opinion of you? Do some of these influencers therefore become important stakeholders in their own right?
- If they are not likely to be positive, what will win them around?
- If you don't think you will be able to win them around, how will you manage their opposition?
- Who else might be influenced by their opinions? Do these people become stakeholders in their own right?

We can validate the completeness of our list by confirming that we have included stakeholders in all major categories: clients or customers both internal and external, governance groups within regulatory agencies, our organization and if applicable our client's organization, contractors or service providers we engage through procurement, the project's core team. Here is another checklist to help us review our project:

- Proactively identifying and engaging stakeholders?
- Raising awareness through targeted approaches?
- Building common understanding?
- Leveraging policy interfaces?
- Empowering stakeholders through task ownership?
- Developing strategic partnerships?

Checklists are a great way to keep us on track and confirm we are doing all the things we meant to do when we started this effort.

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CHAPTER 9: APPLIED CASE STUDY

9.1 WHAT ARE STO PROJECTS?

The refinery, petrochemical, chemical, and process industries comprise a very capital-intensive sector. Today the process plant equipment has become complex due to the complexity of the technology being employed in building process plants. Machines of all types are now installed in process plants. They are more numerous and more complex compared even to those in the 1960s. Maintenance has to take place at a process plant in order to assure its reliability. It is imperative to take the plant off-line (shutdown) to carry out maintenance of large-scale assets. During this shutdown period, critical inspection, equipment overhaul, repair, and plant modification take place. For a couple of months, a part of or the entire refinery is shut down in order to perform maintenance activities, inspections, and so on. This period will cost the refinery a few million dollars, due to lost production. So it is very important to prepare this shutdown period well.

Refineries' petrochemical and chemical process plants operate round the clock during normal operations; therefore, periodic maintenance is required, along with occasional major overhauls. The turnaround is a planned, periodic shutdown of a refinery's processing unit (or possibly entire refinery) to perform maintenance, inspection, and repair of equipment that has worn out or broken in order to ensure safe and efficient operations and to replace catalysts that have deteriorated. Often, improvements in equipment or the processing scheme can only be implemented during these turnaround or shutdown periods. Currently, routine turnarounds for refinery units are planned once every 3–5 years [Lenahan, 2006].

Maintenance activities during a planned turnaround might include:

- ✓ Routine inspections for corrosion, equipment integrity or wear, deposit formation, integrity of electrical and piping systems
- ✓ Special inspections (often arising from anomalies in the prior operating period) of major vessels or rotating equipment or pumps to investigate for abnormal situations
- ✓ Installation of replacement equipment for parts of or entire pumps or of instruments that have worn out
- ✓ Replacement of catalysts or process materials that have been depleted during operations

Improvement activities could include

- ✓ Installation of new, upgraded equipment or technology to improve the refinery processing
- ✓ Installation of new, major capital equipment or systems that may significantly alter the refinery process and product output

From the traditional viewpoint, operational shutdowns and turnarounds are maintenance and engineering events. This simplistic view is held by many

organizations. A more realistic and holistic perspective, however, recognizes that the impact and scope of shutdown turnaround outages (STOs) extend far beyond the maintenance and engineering functions. STOs can command significant capital and operating budgets. They attract the attention of shareholders and boards of directors and impact inventory supply chains and customer relationships. They are, therefore, whole business events, not simply function-specific ones [Sahoo, 2014].

STOs involve both planned and unplanned activities resulting from inspection of a machine that is not accessible or visible during normal operation. The potential for identifying previously unforeseen work requirements discovered during inspection that must be performed within the defined time constraints of the STO adds rapid troubleshooting and decision-making capabilities. The success of the shutdown lies in completing it in the shortest possible time without cost overrun and without any safety incident [Sahoo, 2014].

Shutdown/turnaround costs normally comprise over 30% more of annual maintenance budgets and a delay in start-up can cause a loss of operating profit that exceeds the cost of the shutdown/turnaround. Again, during turnaround, the event requires many people to be diverted and external resources to be brought in.

Shutdowns can be costly in terms of lost production, so a carefully designed plan can reduce costs. Minimizing the duration of the outage can have a major impact on reducing the cost of lost production. Augmenting the resources available to handle shutdown plan scheduling, managing the shutdown activities, and assisting in the start-up of the facilities will minimize the out-of-service time.

The result of a detailed survey on turnaround performance (refer Figure 9.1) is really an eye opener to management and business leaders. A large number of workmen, machinery, equipment, etc., gathering at the turnaround site reverse all characteristic of normal routine. The turnaround increases the potential for harm to people, property and the environment. Safety procedures should be followed strictly to avoid potential loss, which rises exponentially during the turnaround period. Unexpected problems and uncertainties suffered during turnaround activities lead to cost escalation as well as extended shutdown periods. The total loss of revenue is quite large.

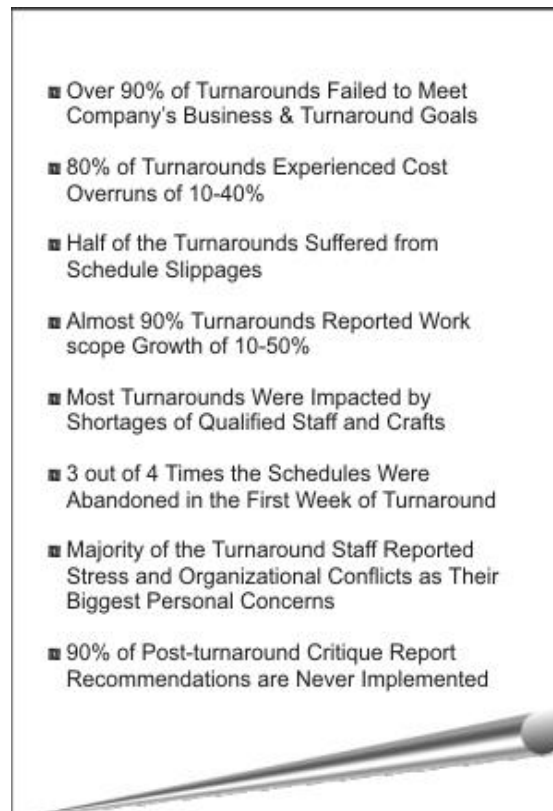


Figure 9.1: Consortium study on TA performance results [IDC Technologies, 2008]

Strategic turnaround planning is a team effort initiated at the initial planning phase to design an optimum strategy to meet the business and operational goals of the company. The real challenge for the turnaround management team is to achieve an optimum balance between the company's business and financial goals and the plant's operational and mechanical integrity needs. Figure 9.2 shows the framework to transform a company's business objectives into high performance turnaround results [IDC Technologies, 2008].



Figure 9.2: TA management framework [IDC Technologies, 2008]

However, in the process industries the maturity of the project management discipline as regards turnarounds is still very poor, stagnant at best. There appears to be little if any development of, or dialogue about, the discipline within the field. Turnaround failures (budgets blown by millions of dollars, target dates missed by days) are still as prevalent as ever. The same mistakes are being repeated over and over. The main problem is that turnaround managers continue to treat turnarounds as if they were 'Engineering, Procurement and Construction' (EPC) civil projects and hence apply an EPC-centric project management methodology.

One of the greatest challenges to turnaround managers is realizing that turnarounds are different from EPC projects. They have their own unique characteristics and demands. They require a specialized project management methodology. Most turnaround managers employ an EPC-centric project management approach to turnarounds. In order to analyze the applicability of this approach, we first need to understand the important differences between turnarounds and EPC projects [Ertl, 2005].

Because the scope is only partially known when execution begins, turnarounds demand much stricter scope management controls. A constantly changing scope (and schedule) means that the baseline schedule is a useless measuring stick. As it is the entire basis for measuring and tracking EPC project performance, it is clear that a different paradigm is required for turnarounds.

A changing schedule and changing manpower requirements make resource levelling, a popular tool for EPC projects, counter-productive for turnarounds. The compressed work basis for executing turnarounds means that all team members have less time to analyze and react to changing priorities. Problems that go unchecked can significantly affect the likelihood of reaching time and budget goals. As a consequence, there is a much greater need to use the schedule to drive the project execution (whereas it is sometimes used mostly as a contractual tool in EPC projects). It is critical for all schedule and progress information to be highly visible, timely, comprehensive and accurate [Ertl, 2005].

With these distinctions in mind, we can now explore the tenets of this thesis and start working towards a turnaround-specific project management methodology.

9.2 SWIMLANE TEMPLATE FOR STO PROJECT MANAGEMENT

Generally, the complexity and the overall difficulty of an STO project increases with an increasing project budget. However, the operational expenditure component of the budget is usually the key factor in determining the overall complexity of the STO project. In general, larger operational expenditures translate to an exponentially larger number of activities and laborers on the site. At this scale, traditional spreadsheet-based project control tools struggle to address the requirement to deliver real-time, highly accurate cost and performance metrics to key project stakeholders during STO project execution. The use of swim lanes for project reporting by a big network of technology companies defines the framework for the systems to be in place to assure the effectiveness of the "full TA-cycle" and optimize plant availability (reduction in Turnaround duration, increase in Turnaround intervals, Improved quality of Turnaround work including flawless start up, reduction of Turnaround costs).

A process using this kind of tool provides direction for the planning, execution and close out of facility Turnarounds. It defines common rules and guidelines, describe best practices that will assist sites in achieving their aspirations for Turnaround Excellence and could be employed as a reference documents for training and expertise management. This process is described is independent of any particular Integrated Computerized Management System. However, it should be noted that an IT management system for Planning and Scheduling is necessary for the efficient execution of this process.

In this chapter the process of managing Turnarounds is going to be described. In order to optimize plant run time and avoid major unscheduled outages, a long-term plant turnaround frequency strategy should be developed. The most senior manager in the company should form a steering team consisting of senior managers to oversee all aspects of the planning and execution of the Turnaround and drive its performance. Senior management should ensure that the Turnaround is aligned with maintenance objectives, production requirements and business goals and define a TA Premise with

goal targets and key indicators. As well as this contracting strategy should be determined for the services required to prepare and execute the turnaround.

Turnaround scope development is the process step that focuses on the scope collection activities from the various input sources (Operation, maintenance, Inspection, Technical services, Projects) culminating in a frozen work list that can be challenged in a scope optimization workshop delivering a final 'frozen' Scope of Work. It is recommended to involve time-to-time some outside participants in the scope optimization workshop (a person from other site, or from TA network, with the appropriate experience) who can bring recent turnaround experience and provide an external perspective on the total scope. The close out of this phase represents an appropriate point for the Scope Definition Review (12 to 9 month before T/A execution).

At this time, the scope statement for the shutdown is being documented including deliverables, and requirements so that they can be used as a baseline for future decisions. The work scope is the foundation upon which all other aspects of the turnaround rest and will have a major influence in determining the final cost. If the shutdown charter is written well, it's simply a matter of transferring the goals and deliverables information from the charter to the scope statement. The scope statement is the baseline for the shutdown. This means if questions arise or changes are proposed, they can be compared to what's documented in the scope statement.

Shutdown planning is uniquely challenging and is considerably more challenging than routine running maintenance as the shutdown durations are kept extremely short because of the need to keep the unit down to a minimum period. The compressed time "allowed" by management generally demands high manning intensity, and delayed material deliveries have the potential to cause the shutdown completion date to slip. Hence, it is essential to complete effective planning of the entire shutdown process on schedule and within budget. In fact, there is a very strong correlation between the length of time allocated to shutdown planning and the shutdown's ultimate success.

At the planning phase the objective is to develop the approved work scope into work packages of detail plans and schedules. The overall Turnaround is represented into logical systems optimizing grouping of assets associated with the operational procedures. All capital project, maintenance and operational activities are combined into a single integrated schedule before critical path scheduling and a schedule optimization are used to optimize the downtime duration. It is recommended to utilize an independent peer review approach to optimize work scope plan and execution, with some outside participants being involved time to time in the schedule optimization workshop (a person from other site, or from TA network or else) who can bring recent turnaround experience with them.

Although the main business of the preparation phase is to plan the work which will be performed during the event, part of the preparation effort must be dedicated to ensuring that all work which has to be completed beforehand (if the event is to be performed effectively) is also planned and executed. Pre-T/A work is the culmination to the preparation activities for the Turnaround. It Includes personnel training, contractor mobilization, delivery of the final Turnaround execution plans, pre-

fabrication activities, issuing the baseline version of the integrated schedule and commencing pre-Work e.g. for scaffolding and insulation. Critical to this phase is the total alignment and effective communication between operations, maintenance and contractors to ensure that all parties understand the work to be implemented, the priorities and the overall sequence.

Turnaround execution begins as feed is reduced and includes unit shutdown, decontamination, and preparation for entry, work execution, pre-commissioning and start-up. Activities of this phase are conducted according to the original premises relating to safety, health, quality, scheduled duration and cost. Proper control of the critical path activities, overall progress and cost control is required in order to meet these overall objectives. A designated team shall care for any Discovery Work to avoid or minimize any disruption of planned activities. Daily reporting and review, ensure appropriate control on the progress of works and follow up of Key indicators, and take appropriate action if necessary.

A Turnaround is a complex event during which problems may arise which have been neither predicted nor expected – no matter how good the planning and preparation. They could be caused by such things as changes of intent, accidents, industrial conflict and so on. The aim is to be prepared – to react speedily and effectively to the situation, minimizing any negative impact. If the incident is not properly controlled the routine can rapidly become the unexpected and the unexpected may become the catastrophic.

The completion of one turnaround is the next shutdown's starting point. The stage covers demobilization of contractors, lay-down area cleanup, disposal of excess material, documentation and updating the turnaround historical database, cost reports, and most importantly lessons learned that could be carried forward to the next turnaround. Executing this stage in a timely manner with a quality result will depend on data collection effectiveness during the execution stage.

The other important point about formally gathering and recording the metrics for the Turnaround is that it provides us with crucial information on past performance when we initiate future Turnarounds. It is a vital part of the package of information that allows us to link Turnarounds that may be separated by a number of years into links in a continuous chain.

While it may be true that each individual Turnaround is a 'project' in its own right, when taken together the performance of successive Turnarounds over a period of years becomes a 'process' – more a business process – and, as has been demonstrated by systems science time and again, the lifeblood of effective processes is the feedback of information on performance. The importance of this simple routine cannot be overstressed.

Throughout the Turnaround milestones will help as a ready reckoner of the entire turnaround process. A Milestone Schedule must be established by the Project Manager (Turnaround Manager) immediately following the establishment of the Initial Budget. Monitoring these milestones will give complete control of the turnaround activities.

A Responsibilities Matrix must be used to determine the assignment of Milestone Schedule activities to the Core Team Members. A weekly project management meeting must be established where members of the Core Team meet for one hour to review

their assignments and update Milestone Schedule activities. The Milestone Schedule activities must support all the activities identified through the planning phase. The Milestone Schedule must be updated weekly and progressed to demonstrate performance and trending. The Milestone Schedule weekly meeting must be attended by each member of the Core Team.

Furthermore, the success of any project is based on the ability to measure performance in real-time. What to measure is usually determined by the project team. As with all measurements, a single indicator can mislead. It is, therefore, necessary to design a number of criteria to provide a balanced indication of performance of the shutdown [STO Navigator, 2011]. Figure 9.3 lists some suggested criteria. The key indicators for facility and unit outages are generally identified as:

- Establish a Vision for each project (purpose, reason, benefit and risk of executing the project)
- Establish a Mission for each project (the outcome of the project itself)
- Establish Key Performance Indicators for every project
- Safety / Environment (responsible care)
- Cost
- Outage Duration
- Quality
- Worker Performance

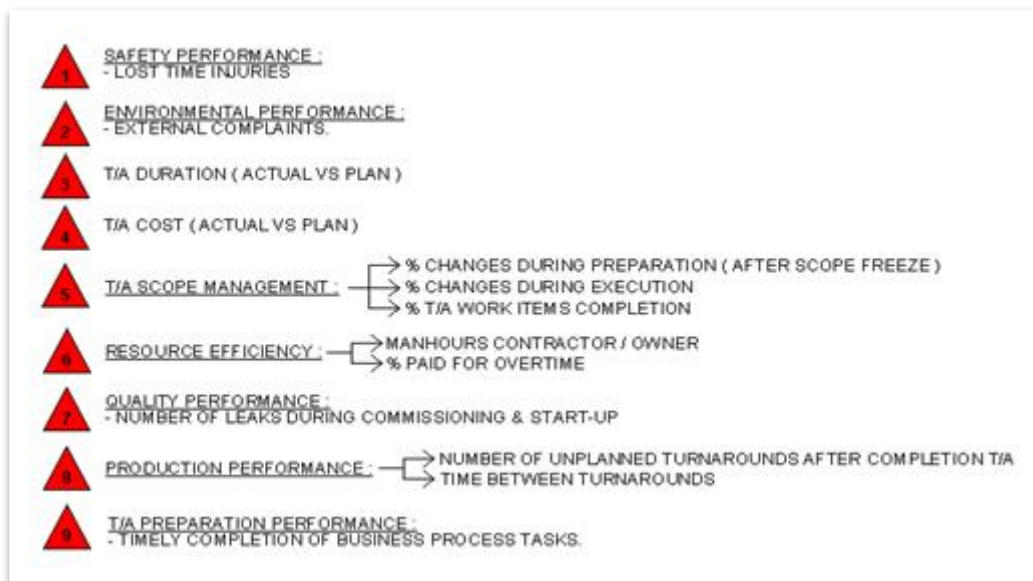


Figure 9.3: Metrics and KPIs

Establishing Goals, Objectives and Strategies for each Key Performance Indicator (it does no good to say you're going to do something and not have goals, objectives or strategies in place to indicate how you intend to meet or exceed them) is a responsibility of the Project Leaders Team and agreed to by the Project Core Team or Steering Committee. Key Performance Indicators must have realistic targets and all project performance statements, indicators and targets must be communicated to everyone involved in the project including contractors. During project execution we should update each Key Performance Indicator daily with current data to measure performance, trend and forecast outcomes, take corrective action and offer

recognition. If we focus on Safety, Quality and Worker Performance – Schedule and Cost will take care of themselves

Combining process tasks, key performance indicators and milestones in swim lane flowcharts we can quickly and easily plot and trace processes and, in particular, the interconnections between processes, departments and teams. The swim lane flowchart visualizes a process from start to finish and differs from other flowcharts in that processes and decisions are grouped visually by placing them in lanes. Parallel lines divide the chart into lanes, with one lane for each person, group or sub process. Lanes are labelled to show how the chart is organized.

As shown in figure 9.4 the vertical direction represents the sequence of events in the overall process, while the horizontal divisions depict what stakeholders are involved in that step. Arrows between the lanes represent how information or material is passed between the processes. When used to diagram a business process that involves more than one department, swim lanes often serve to clarify not only the steps and who is responsible for each one, but also how delays, mistakes or cheating are most likely to occur. When looking to improve processes, knowing which department is responsible for what can help speed up the process of correcting inefficiencies and eliminating delays.

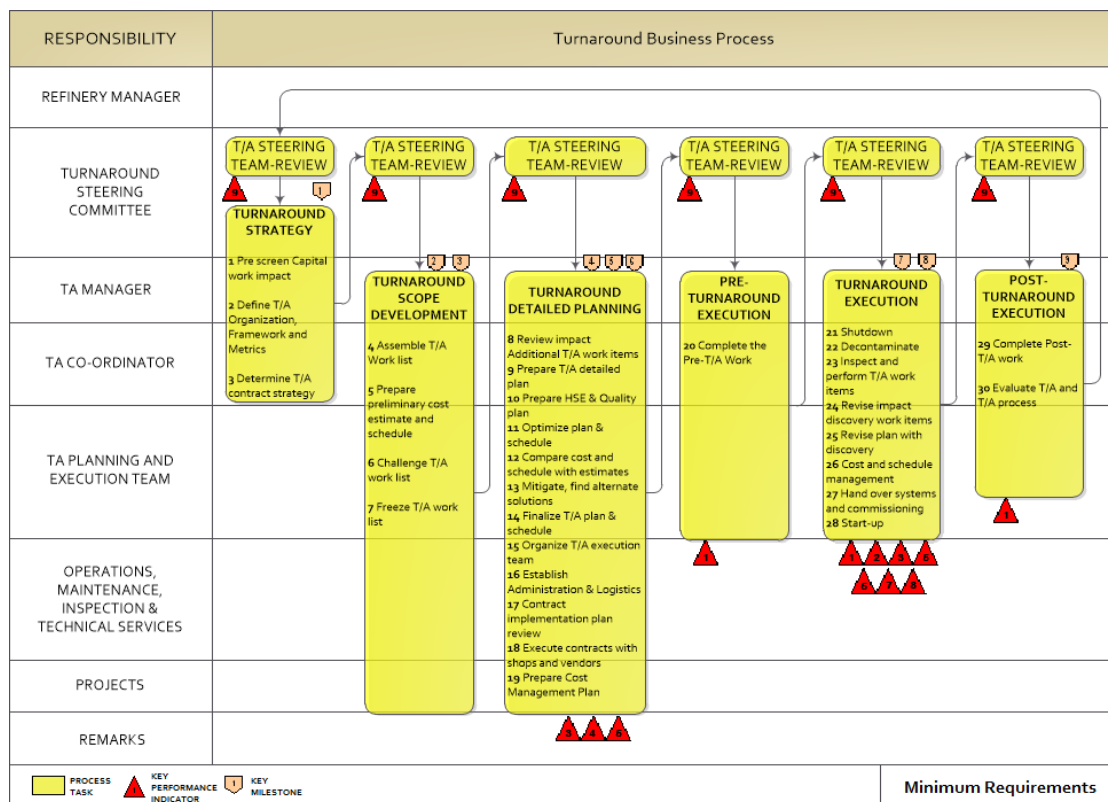


Figure 9.4: Turnaround Business Process

9.3 DESIGNING THE TURNAROUND ORGANIZATION

The client had performed two Turnarounds over the previous four years with unsatisfactory outcomes. The events had taken longer to complete and cost more than the planned targets. The feeling among the client's personnel was that although the event had been well planned, they had 'lost the plot' on the day due mainly to what they termed as a lack of co-ordination. In the client's view, performance had always been satisfactory until four years ago [Lenahan, 2006].

Carrying out an assessment audit six months before the programmed start date of the Turnaround discovered that, traditionally, the teams that executed the Turnarounds had not been formally planned but had evolved over a number of years based on available personnel and depending upon the wealth of experience that those people had gained (but never recorded) over the years.

Having lost a good deal of experience over the last years there was no one left in the company who understood Turnarounds or could specify the functions required to perform one effectively. Although there had been a sea change in the nature and form of the client's organization the management had not responded to the change and were still trying to execute Turnarounds as they had always done. This was clearly inappropriate.

Consequently the planning team could not get their planning and schedule completed before the start of the Turnaround and for this reason the Turnaround (especially the first few days) was disorganized. They felt that they always allowed enough time to plan and were at a loss to understand why they always seemed to start the Turnaround with an unfinished plan.

Two discrete kinds of knowledge were employed to ensure an effective organization. The first was knowledge of Turnaround systems and organization, which was provided by a subject matter expert, and the second was local knowledge of the plant and the available people provided by the engineering manager and other company personnel who became involved in the design of the shutdown organization.

A company which is committed to getting the best value from its Turnaround program can realize this commitment in a concrete way. The most senior manager in the company should form a steering group consisting of senior managers who take responsibility for the long-term strategy for Turnarounds. The steering team was established to manage a specific unit(s) turnaround with decision-making authority for the cost, duration and scope. The team would include representatives of Operations, Engineering and Asset management, the Turnaround Manager, technical representative, operations planning or procurement. Among other responsibilities the committee would conduct an early stakeholder analysis in order to define the turnaround management structure to oversee all aspects of the planning and execution of the TA and drive its performance. A stakeholder analysis worksheet is shown in figure 9.5 below.

Stakeholder name and project role	Responsibilities	Interest (1)	Degree of support	Current status (2)	Actions desired (if any)	Impact (3)	Risks/Benefits of involvement
Chairman and CEO	Will ensure that shareholder value is achieved and that the business objectives of the Turnaround Project are met.	High		Supporter		High	
Refinery Manager	Accountable to Senior Management to meet Key Performance Targets, assigns Project Manager						
Project Manager	In charge of the organisation and the execution of TA activities. Enforcement of HSE rules, Managing and coordination of all participants to ensure that the works plan are executed as per the schedule and the objectives defined by the TA Premises. Informs the steering team about TA Progress and the risk with regard to the objectives of the TA.						
TA coordinator (Maintenance Manager)	Coordination of supervisors and contractors, and support function, resolution of conflict, communication of the objectives to the execution team and reporting progress to the TA lead.						
Accounting Manager	Reconciles daily project funding accounts; also responsible for the funding, journalizing, and reconciliation of the bank account used in connection with the project.						
Operations engineer	Coordination of Operators with contractors and Maintenance supervisors, resolution of conflicts, management of communication to and from the Operators.						
TA Planning Team	Responsible for the planning of the Turnaround and good communication with all sections/external agencies.						
TA field supervisors	Responsible for the effective execution of the field activities as defined by the work plan, and as per the schedule, in their area of responsibilities. Supervision of contractors and own staff to execute the work plan, according to the objectives defined by the premises.						
Contractors and workshop coordinators	Responsible for ensuring the availabilities of resources, in number and in skill, their proper distribution of the contractor resources across the TA areas, to define priorities and to manage conflicts.						
Safety Team	Responsible for formulating the fire prevention precautions required to be taken during a turnaround; chalking out the training program required for the contract workmen, envisaging the medical services required in the premises.						
Workshop personnel	Perform allocated work activities and report problems to the field supervisor						
Emergency services (both company and community)							
Environmental and Safety organizations		Medium					
Oil and gas end users		Medium					

Figure 9.5: TA stakeholder analysis worksheet

Using Mindjet software we tried to visualize our shutdown project in a mind map charter defining the vision, objectives, scope, and deliverables for the shutdown. As shown in figure 9.6 objectives were concise and measurable as well as applicable to each phase of the shutdown and reflected the outcome established by the vision. Taking into consideration the lists of work requests generated by the members of the steering committee, the maintenance work for each unit was captured at the requirements branch. Afterwards we prioritized the work needed with the use of prioritization flags answering questions such as "Is the shutdown work really necessary and vital to the safety, quality, or production efficiency of the plant?" and "Is it desirable at this time in the life of the plant?".

As scope management is one of the greatest challenges in a turnaround every task should be analyzed properly, which was done at a series of meetings. The effectiveness of the work list meeting set the pace for all other activities on the Turnaround. Speed, as well as accuracy, was important. Some of the participants at these meetings were the major players responsible for planning, including the turnaround manager, section engineers for certain areas of knowledge, plant supervisors, subject matter experts (SMEs), and functional leads. The known work list was analyzed and the typical work scope comprised categories of work such as statutory or company inspection requirements, preventive and corrective maintenance on known defects, plant cleaning routines and work generated by the Turnaround.

At this phase we included in the mind map the tasks to be done expanding the requirements branch further and presented it to the senior management. This was used as the project dashboard as we moved through the planning phase. Furthermore we distributed the map to more people who needed to see that and as soon as we took their approval we could start generating much more detailed planning information.

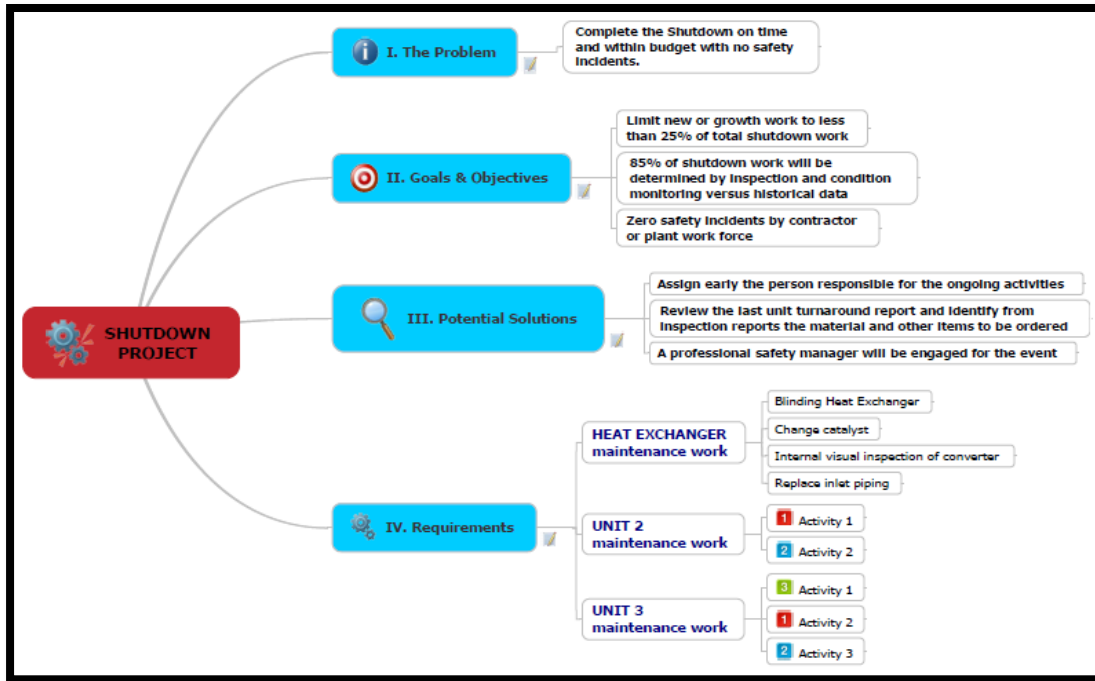


Figure 9.6: Sample Shutdown mind map

Having the work list in space we designed an 'empty box' organogram based on the question 'What specific roles do we need to perform the Turnaround?'. At this stage, each box in the organogram required only a job title as shown in figure 9.7. Afterwards using the stakeholders analysis work sheet we were capable of matching the people to the functions and fill in the names of those we intended to use in each of the boxes, so we could compare 'what we had' (actual organogram) with 'what we needed' and expose any shortcomings. Finally we briefed (and if necessary trained) everyone on their roles and responsibilities to ensure they understood them. This was best done by face-to-face briefing as briefing by e-mail would not be sufficient.

Prior to the execution phase, we should confound our stakeholder engagement strategy. Based on the Power/Interest Grid and the stakeholder engagement assessment matrix we created in our Stakeholder Analysis, we updated the stakeholder analysis worksheet entering the stakeholders' names, their influence and interest in our project, and our current assessment of where they stood with respect to it. Then we had to identify the messages that we needed to convey to our stakeholders to persuade them to support us and engage with our project goals.

In order to win and manage the support of these stakeholders we identified how each of the stakeholders would be kept informed of the progress. The stakeholders' management plan included the types of information to be distributed, the methods of distributing information to stakeholders, the frequency of distribution and responsibilities of each person in the shutdown team for distributing information regularly to stakeholders. We also set up an intranet site for our shutdown and posted the appropriate shutdown documentation there for the stakeholders to access anytime they wished.

Another major help to the proper stakeholder engagement was the use of swim lanes templates as we included all contributing or affected stakeholders in each process.

This meant that connections, communications and hand-offs between departments and teams were clearly mapped. By having this formal method for identifying and integrating processes between departments and teams, you ensured the connections, communications and hand-offs are well-designed and well managed.

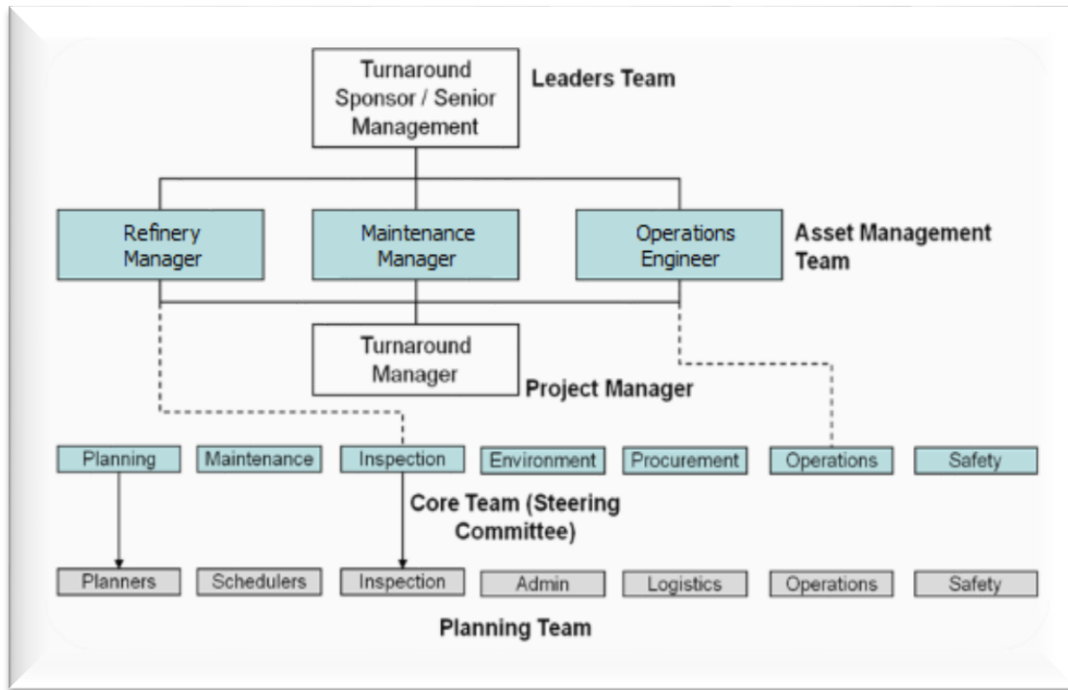


Figure 9.7: Organogram of the shutdown organization [STO Navigator, 2011].

As a result the requirements and work list were clearly defined due to supportive stakeholder engagement allowing the planners to organize and complete the planning and scheduling two weeks before the start of the shutdown. This gave time for a risk assessment to be carried out on the schedule and greatly increased the team's confidence regarding a successful outcome to the event.

The other advantage was that once the work list stabilized the Turnaround manager was able to produce a 'ballpark' estimate (accuracy + or -20 per cent). This indicated that the budget allocation was 25 per cent less than required. The senior management agreed to provide extra funds because the plant manager was able to prove to their satisfaction that, by using the processes described above, he has justified every job on the work list.

The Turnaround was subsequently completed by the designed organization within the budget and with one day over-run on duration. The over-run was due to emergent work and it was estimated that, had it not been for the emergent work, the Turnaround would have finished half a day ahead of plan.

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SUMMARY AND CONCLUSIONS

The Standish CHAOS Report, which surveyed 9,236 projects, found that the top three causes of project failure were lack of user input, incomplete requirements or changing requirements. According to the Standish Group International CHAOS Survey – U.S.A the Factors for Project Failure Deal with Requirements is shown in figure 1.

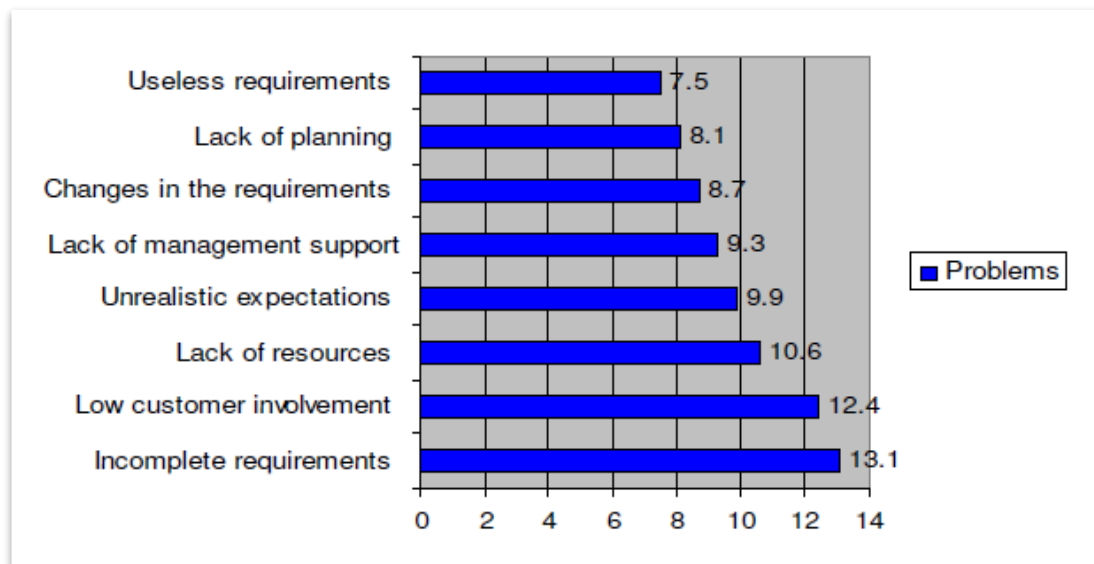


Figure 1: Project failure due to requirements factor

Inadequate stakeholder involvement is one of the most-reported causes of poor requirements from the beginning during requirements elicitation, through validation, and later while the requirements are managed throughout development, test, and delivery. In all these areas of the requirements lifecycle stakeholder involvement is crucial and when it is lacking, requirements quality is at risk. The purpose of validation is to ensure, with stakeholders, that the requirements are complete both individually and as a set. Issues not detected during validation means that poor requirements are being delivered to development and test. Inadequate validation can be due to a number of reasons ranging from inadequate time or involvement, to poor process or tool support.

Eliciting requirements is one of the primary responsibilities of the business analyst, as the requirements serve as the foundation for the solution to the business need. A business analyst will use numerous techniques during the course of a project depending on the information being elicited and the types of stakeholders involved. There are many proven techniques for eliciting requirements from which the business analyst may choose, and new methods continue to evolve.

This thesis builds upon the associated tasks and techniques introduced in the Business Analysis Body of Knowledge and the Project Management Body of Knowledge to accurately define our project outcomes. We presented how to collaboratively develop project requirements by eliciting, analyzing, documenting, validating and managing requirements across the project life cycle. Core Competencies for the project manager

and business analyst by exploring the commonly used techniques for eliciting requirements are the applicability of each technique, the steps required to prepare and execute each technique, and methods to overcome common challenges associated with each technique.

Throughout the chapters of this thesis practical tasks, processes and techniques were presented that included steps for effectively developing, defining and managing project requirements. The purpose of this is to equip the project manager with the skills and knowledge required to perform requirements elicitation techniques to gather accurate and complete requirements from stakeholders in real world business situations.

The use of Mind Manager Software helped integrating people, tools, methods and procedures when also striving for consistency and understanding for all involved parties. The mind map format offers the flexibility to show the big picture and then drill down to show details, guiding focused discussions in context, all in a single view. By using visual, interactive mind maps to brainstorm goals, identify issues, and gain agreement on priorities, project managers can get the management buy-in they need to get projects started on a firm footing.

Once goals, budget and priorities for a project have been clearly defined, the next step usually involves laying out a detailed schedule that shows all the actions to be completed, by when and by whom. Just as it's critical to gain stakeholder alignment on goals and priorities, it's equally important to get the commitment of the people who'll be doing the work. All the elements of the plan can be mapped out collaboratively, ensuring that everyone is clear on what their responsibilities are and when certain milestones must be reached.

A mind map is the perfect tool for driving commitment as priorities and dependencies are clearly labeled during a project mapping session. The fact that stakeholders must agree on the exact priority level of goals leaves no wiggle room, so ambiguity is eliminated. Keeping that in mind the importance of stakeholder identification in determining the final scope of the project being undertaken is once again highlighted.

Running with basic requirements without the benefit of an independent assessment may lead to a narrow vision of the risks involved. Project risks can be further reduced by maintaining an awareness of external factors that constrain or impose boundaries on the solution or service being built and by maintaining a solid foundation for standardized communication. Planning and budgeting for a project must therefore consider the resistance and opposition to the project's end goals and objectives and maintain its mission by being mindful of these common blind spots that endanger the path on its way to project success.

There is an old saying that goes: "proper planning prevents poor performance". This statement is definitely true when it comes to identifying, analyzing and engaging our project stakeholders. What we have covered so far is solid best practice concepts and working with our project stakeholders group. Focus on helping the project team to communicate with and involve all appropriate stakeholders is very important. It's ideal when one is operating within a mature organization with well-established methodologies, processes and templates to help with these elements of the project. When maturity is missing we will need to step up and provide strong and consistent

leadership for our team and management. Our team will get used to that structure and process time after time even if the organization does not have that consistency. Only then will the organization be ready to improve their project maturity and match some guidance.

Just asking customers what they want seems counterintuitive. Teams are supposed to talk to customers and give them what they want in a product. But customers tend to talk about features, not what they truly need. The truth is that people often don't know what they want. And when customers don't know what they want and the project team doesn't understand the problem, poorly conceived solutions — and products — can result. Asking customers why they need a particular solution may lead to a better understanding of their expectations and better discussions about specific requirements. Identifying the right stakeholders helps us determine the true and realistic product requirements that will deliver value to them. For this reason we have to find and listen to the right mix of users, customers, executives who fund the project, government representatives who impose regulations, project teams, support teams and others.

One other problem that could result to project failure and is caused by poor stakeholder management is the lack of effective and frequent communication. Failure to communicate with stakeholders early and often leads to one primary problem: rework. Developing a product for customers without consulting them while that product is being developed is just asking for trouble. The biggest reason it happens is that we often think we know what our customers want well enough that we don't need to consult them. And stakeholders usually have different priorities. Sometimes teams don't communicate with stakeholders because they prefer to avoid confrontations. But if we want a positive end result and minimum risk and rework, it is important to collaborate with stakeholders not just at the beginning of a project but throughout the entire process, from start to finish.

Proper stakeholder mapping helps us know our audience and express requirements using methods our stakeholders can easily understand so we can possibly gain consensus on requirements. We should choose a representative from each group of stakeholders and elicit feedback from every one of them, and remember that one or two people tend to be the most vocal. By taking into consideration others' feedback makes the most efficient use of everyone's valuable time and helps avoid misunderstandings that derail projects. Making it easy for our stakeholders to provide feedback and letting others see their feedback to generate better discussions reduces risks, increases team productivity and avoids rework. Ultimately it helps deliver the product the customer really wants.

"Irrespective of actual project outcome, stakeholders who have been engaged and whose expectations have been managed are far likelier to perceive a project as a success than those who have been ignored," writes Newton. It pays to engage with the right stakeholders all the way through the project, especially if it changes how they feel about the project at the end. Projects don't always deliver exactly what they set out to, so managing stakeholder engagements over the duration of the project is one way to help stakeholders adapt their expectations to what is realistic for delivery.

Missing and ambiguous requirements can easily result in missed schedules, cost overruns and decreased productivity and quality as downstream project deliverables fail to provide value to stakeholders. Organizations must have the ability to review, assess and improve their requirements process. Having accurate insight into data, processes and practices is a key component of success. Measuring project and process outcomes allows for continual process improvements across the project lifecycle, which reduces project failures and lowers business costs.

As part of the process, it's good to conduct a "lessons learned" feedback session at the end of each project and a "lessons remembered" session before starting a new project. To encourage continual improvement, we need to not only capture lessons learned at the end of a project but also reinforce those lessons as we move forward. We should define and collect metrics that ensure our success. For example, we should measure the impact of changes to our requirements, test case coverage, priority, cost and effort of business, and product requirements. As we become more experienced with measurement, we'll find just the right combination of metrics that allows us to continually improve our requirements process. Ongoing measurement of project performance reveals small problems before they become big issues.