High-Level Requirements Elicitation

by

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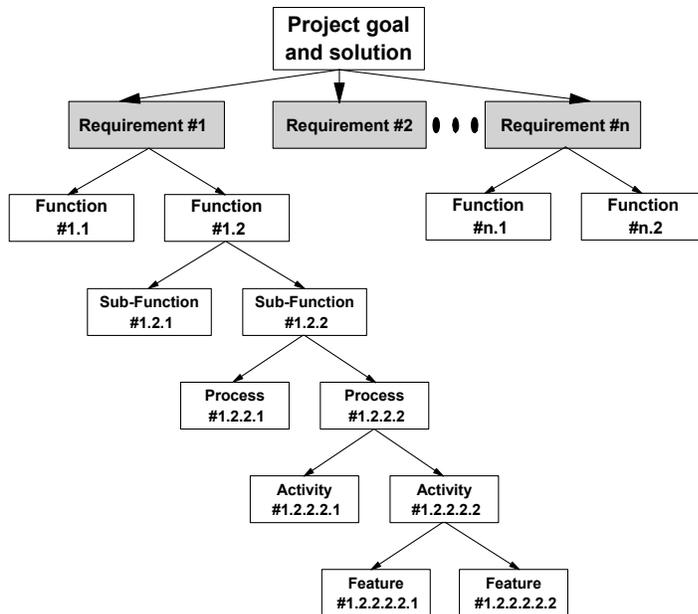
Project management thought leaders are of like mind in that a complete description of requirements is unlikely during project initiation. Beyond the complexity and uncertainty, the project is affected by the changing internal environment and external market dynamics. Managing a complex project using PRINCE2 is of course complex by definition but the challenge is further increased due to incomplete requirements (similar to the PRINCE2 Project Product Description). The situation is not hopeless and there are mitigation strategies that are available in the ECPM Framework during the Project IDEATION Phase and these are easily incorporated into the PRINCE2 Process.

This article put forth a new definition of requirements (PRINCE2 uses the terms Project Product Description and Product Breakdown Structure) that eliminates the problem of incomplete requirements at Project Initiation. The definitional change is simple and paves the way for fully engaging the Client in Requirements Elicitation.

PRINCE2 recognizes requirements under the term specifications but does not provide any details. However the PRINCE2 Framework should include an understanding of how requirements are defined, elicited and implemented in the life span of a complex project. Having this understanding is a valuable addition to the PRINCE2 practitioner and professional as they accommodate the uncertainties and complexities of contemporary projects. That is the purpose of this article.

UNIQUE VALUE PROPOSITION

The two-level requirements definition eliminates the problems that arise from not having a complete statement of requirements at the outset. The highest level is a clear statement of "WHAT" an acceptable solution must deliver. The second level is a decomposition of the "WHATs" as a learning and discovery process done during iterations.

REQUIREMENTS ELICITATION

Some use the term "Gather Requirements." In the case of complex project definition, I don't think that is the correct term to use. Requirements aren't scattered around waiting to be picked up. In most cases they have to be defined based on client needs. A more appropriate term for that activity is "Elicitation". It is suggestive of a process in which requirements must be drawn out from the product knowledge of the client and the process expertise of the project manager. In some cases this will present a big challenge to the project manager. In other cases it will proceed almost without incident. Many would argue that complete requirements can only be elicited up front for very simple projects that have a long history of successful execution. The ECPM Framework is based on that assumption.

Definition of ECPM requirements

Realizing that requirements cannot be known at the initiation of a new complex project has led to a number of challenges to effective complex project management. Those challenges are related to scoping an acceptable solution, estimating the time, cost and resource requirements needed to build that solution. Those challenges can be minimized by a simple redefinition of a requirement. That is our starting point for this article. The working definition that I am proposing of an ECPM requirement is consistent with the IIBA (2009) definition, but takes a different perspective on requirements and how their elicitation will be undertaken.

DEFINITION: ECPM Requirement

An ECPM requirement is an end-state condition whose successful integration into the solution delivers specific, measurable, and incremental business value to the organization.

The set of ECPM requirements is a necessary and sufficient set for the attainment of all project success criteria including the delivery of the expected business value.

Wysocki (2014)

This definition postpones the challenges associated with incomplete requirements and moves them to later in the project.

Requirements define the properties and characteristics of the product, process, or service that is the deliverable of the project. These requirements are the basis for analyzing the effect of any changes to a current situation that your client is seeking. A requirement exists either because the product, process, or service demands certain functions or qualities not present in the current solution. Project requirements start with what the customer really needs, and end when those needs are satisfied. (Note that I am saying "needs," not "wants.") This often leads to nonessential or over-specified requirements, or some other anomaly. You are cautioned to be very careful about assuming who knows what and who understands what. Double check that the client understands every STEP of the way. The Conditions of Satisfaction (COS) (described below) is a client-facing tool I developed more than 20 years ago, and it has served me well for these purposes.

> **What your client wants may not be what your client needs. As project manager your job is to make sure that what they want is what they need and that you will deliver what they need.**

This definition of an ECPM requirement is quite different than the IIBA definition of a requirement, but in its simplicity and uniqueness, it puts the connection between requirements and the project in a much more intuitive light. ECPM requirements will be the causal factors that drive the attainment of the success criteria, as stated in the POS. Every ECPM requirement should be directly related to one or more project success criteria. This definition results in a small number (8-12) of requirements at the beginning of the project, whereas the IIBA definition generates hundreds of requirements, which can never be considered a complete set at the beginning of the project. The mind could not grasp completeness, anyway.

Subject to the learning and discovery that may uncover other requirements, the list generated using the ECPM requirements definition can be considered complete at the beginning of the project. The decomposition of those requirements is not fully known at the beginning of the project, however. An ECPM requirement is a more business value-oriented definition than the IIBA definition.

The learning and discovery derived from completed project cycles will clarify the ECPM requirements through decomposition to the function, sub-function, process, activity, and feature levels. The first level decomposition of an ECPM requirement is to the functional level, and can be considered equivalent to IIBA requirements. So, while you can identify all ECPM requirements at the beginning of the project, you cannot describe the details of the requirements at the functional, sub-functional, process, activity, and feature levels. This detail is learned and discovered in the context of the cycles that make up the project. This two-STEP process for Requirements Elicitation is consistent with the Lean Principles (Poppendieck and Poppendieck, 2003), too.

The ECPM definition of requirements should be preferred to the IIBA definition because it ties requirements directly to the project success criteria, which is not the case with the IIBA definition. That makes it possible to prioritize ECPM requirements, whereas no similar case can be made for prioritizing IIBA requirements. In an IIBA, setting priorities is more of a technical assessment than a business assessment.

The choice of a single project to propose can be made based on the high-level requirements. Since the requirements describe an acceptable solution, the decision can be driven by the degree of fit between a proposed project and the effectiveness it will have in producing deliverables that satisfy the requirements. Reaching this decision is subjective—not objective.

Stakeholder Participation in Requirements Elicitation
Those who affect or are affected by a project define the members of the stakeholder group. They interact with each other across the project life span. These interactions will be discussed in context. How stakeholders interact with one another through the ECPM Framework Project IDEATION Phase is shown in Figure 3.1. In general there are eight such stakeholders:
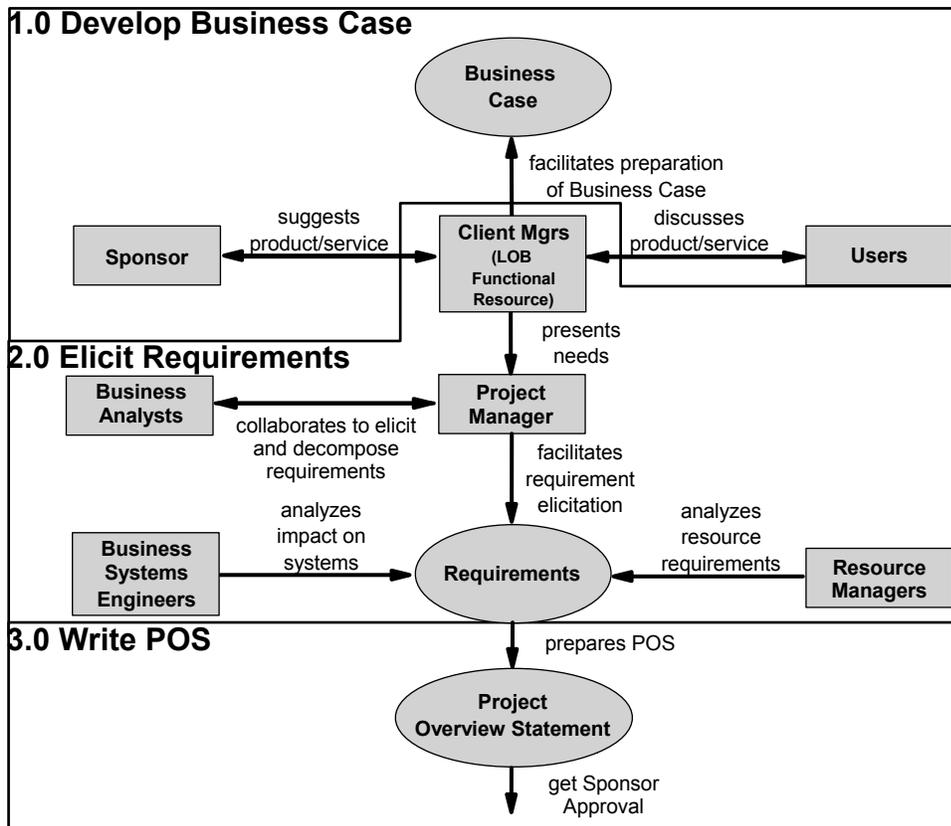
Figure 3.1: The Stakeholder Interaction Model for the Project IDEATION Phase

➢ **Sponsor—**The senior manager who "pays the bill." S/he may originate the idea for the project or may respond to a request from the client manager for the product, process, or service. It may be a new product, process, or service to take advantage of an untapped business opportunity or a project that improves an existing product, process, or service.

➢ **Client Manager—**The person or department that will own the deliverables from the project. They collaborate with the sponsor and the user regarding project deliverables, and represent both the sponsor and the user in the requirements elicitation and decomposition exercises. They will often manage the implementation of the deliverables produced by the project. There will be situations where the deliverables are owned by more than one department, as will be the case with enterprise-wide applications. These situations present challenges to satisfying competing needs.

➢ **Users—**The person or department that will use the deliverables from the project. They may be internal or external to the enterprise. In many cases, a user may have proposed the original project idea.

➢ **Line-of-Business (LOB) Managers or Directors—**A collective manager type. There are no positions named "LOB Manager." An LOB is a manager or director of a business unit that directly produces business value, usually but not always financial. An LOB manager or director has responsibility for a product, process, or service that uses resources to directly interact with customers, users, or clients to produce business value.

➢ **Functional Managers**—A collective manager type. There are no positions named "Functional Manager." Some functional managers are resource managers. The key differentiator is whether they manage resources directly or use resources to produce business value. So, for example, the Director of Marketing is a functional manager. S/he uses the data warehouse (a resource) to produce a marketing plan that generates business value through increasing sales. On the other hand, the Director of Human Resources is a resource because s/he directly manages the human resource. One might argue that they could also be a functional manager if they manage a professional development program that produces a skill and competency inventory that is aligned with the project, program, and portfolio needs of the enterprise. If you think at the role level, the apparent conflict is easily resolved. In the role of managing the human resource, they are a resource manager. In the role of managing the professional development program, they are a functional manager.

➢ **Resource Managers**—A collective manager type. There are no positions named "Resource Manager." This is anyone in the organization who has total and direct stewardship responsibility over a resource that contributes directly to the creation of business value. It includes those functional managers with responsibility for resources that have business value, for example, Human Resource Managers (human assets); financial managers (financial assets); sales, marketing, and public relations managers (intangible assets); IT and engineering managers (intellectual property and knowledge assets); and plant or equipment managers, who have stewardship over and manage the physical assets of an organization. Depending on the specific circumstances, these people are often those who, in their role, function as project sponsors. They have decision-making authority over where the assets under their charge are deployed to create expected business value.

➢ **Business Systems Engineers**—The technical person(s) who has stewardship responsibilities for the design and implementation of the associated business processes and systems that are affected by or affect the deliverables. Many organizations still use the title Systems Analyst.

➢ **Project Managers**—These are the enablers. They are the facilitators of the requirements elicitation and decomposition process. They are responsible for managing the resources to produce the project deliverables. In the co-manager role, the project manager might manage the developer team. The other co-manager will manage the client-side team. These managers could be anyone from among the other managers cited above.

➢ **Business Analysts (BAs)**—These professionals are familiar with the customer processes, user practices, and the processes they will be using to apply the products or services delivered by the project. They will often act as support to the project manager and as an interface between the project manager and the client. Their primary responsibility is to help transform stated business needs into business requirements. Those in more senior business analysis positions may be appointed co-managers by the business unit of their specialty.

Requirements Breakdown Structure
Requirements have always been a sticking point in the process of deciding how to manage a project. There will be those situations where the project has been done several times, and there is a dependable history of those efforts. For example, the project involves installing a computer network in a field sales office. This project has been done several times before in other field

offices. There are no surprises and all requirements should be known. There may even be a template work breakdown structure (WBS) as well. At the other extreme are projects that have never been done before, and there is little history of similar efforts for even parts of the project. These will be high risk projects and most likely complex projects, too.

DEFINITION: Requirements Breakdown Structure

The requirements breakdown structure (RBS) is a hierarchical description of all ECPM requirements that must be present in the solution in order to deliver the business value expected. The RBS hierarchical structure may include any or all of the following:
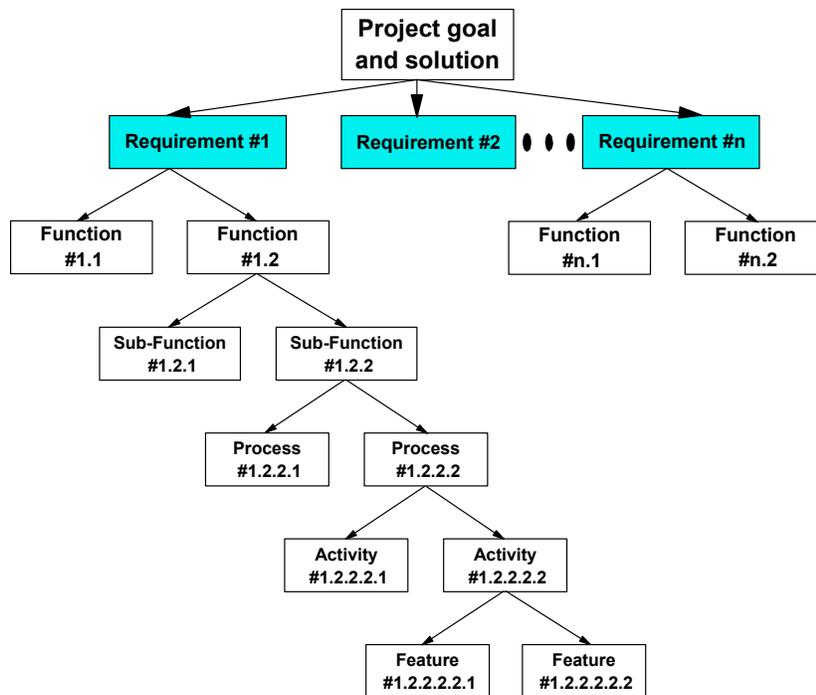
- *** Functions**
- *** Sub-functions**
- *** Processes**
- *** Activities**
- *** Features**

Elicitation and Decomposition of ECPM Requirements

In the ECPM world, the elicitation of requirements is a two-step process: ECPM requirements elicitation and ECPM requirements decomposition. The first step is to elicit a set of high-level requirements that form a necessary and sufficient set of requirements in which inclusion in the solution will assure project deliverables that meet expected business value. Regardless of the complexity of the project, this high-level identification of requirements will be complete. These requirements capture what will be in the acceptable solution, but not how they will be developed or even if they can be developed. These high-level requirements are considered a complete description of what a solution must deliver from a performance perspective. The second Step is to decompose the high-level requirements for further description of what each requirement includes. The results of the second step inform the team as to how they might manage the project. At this point, however, the decomposed requirements definition is limited to what needs to be part of the acceptable solution, but not how those decomposed requirements will be built and integrated into the acceptable solution. That is the province of the iterations that define the project management approach. There the process of learning and discovery takes place as the solution unfolds over the course of the iterations.

Representing Requirements: The Requirements Breakdown Structure

It is best to think of the Requirements Breakdown Structure (RBS) at two levels of decomposition. At the highest level is a list of "What" must be in an acceptable solution. At the next level is a hierarchical list of a more detailed description of each Requirement. If you add a third level of decomposition, then the RBS transitions into a Work Breakdown Structure (WBS). So far, requirements were defined from the perspective of what those requirements have to do. Functions, processes, and activities offer us the details of that definition. Given that understanding, our requirements admit a structure like that shown in Figure 3.2. For those of you familiar with the WBS, you will see that this is quite similar to a functional-based WBS (Wysocki, 2014a). And it is, so nothing is new there. However, what is new is what we are going to do with RBS. The RBS (used in the same way as the Product Breakdown Structure in a PRINCE2 project) will be the basis on which you decide how to structure the project management approach you will use for a project with this type of RBS (the reference here is to complexity, completeness, and uncertainty of the RBS for the project at hand).

Project goal and solution

Requirement #1 **Requirement #2** ❘ ❘ ❘ **Requirement #n**

Function #1.1 Function #1.2 Function #n.1 Function #n.2

Sub-Function #1.2.1 Sub-Function #1.2.2

Process #1.2.2.1 Process #1.2.2.2

Activity #1.2.2.2.1 Activity #1.2.2.2.2

Feature #1.2.2.2.2.1 Feature #1.2.2.2.2.2

Figure 3.2: The Requirements Breakdown Structure

As you gather and document requirements by whatever method you choose, place them in their appropriate level in the RBS. The graphical format shown in Figure 3.2 works well. Alternatively, you could present the RBS in an indented outline format. It's all a matter of preference.

Here is a brief description of each level in the decomposition:

➢ **Solution—**The solution is the output from STEP1: Develop the Business Case.

➢ **Requirement—**Requirements 1 through *n* form the necessary and sufficient set that describes an acceptable solution. Usually, this set will contain 6-12 requirements. The "necessary and sufficient conditions" statement means that all ECPM requirements are needed in order to achieve the success criteria, and none of the ECPM requirements are superfluous. This is important because the project was justified based on the expected business value, as described through the success criteria. Linking the ECPM requirements to the success criteria provides a basis on which to prioritize not only the ECPM requirements, based on their contribution to expected business value, but also to the prioritization of the functions, sub-functions, processes, activities, and features that define requirements decomposition. Unlike the IIBA definition*,* requirements is a term restricted to this high-level description.

➢ **Decomposition Levels**
Decomposition of the requirements can occur on different levels:

• **Function—**At the discretion of the project manager, the highest level of decomposition may be at the function level. This level comprises the functions that must be performed in order for the parent requirement to be acceptable. It is important to understand that the RBS reflects what is known about the solution at the time the RBS is first defined. This initial list of

functions may or may not be complete. Neither you nor the client can be expected to know if that list is complete. You might know that it is incomplete, but you would not know that it is complete. How could you? For the sake of generating the RBS, you have to proceed on the basis that the initial list will be complete. If it turns out that it is not, you will discover that as part of doing the project.

- **Sub-function**—At the next level of decomposition are sub-functions. For more expansive functions, you may not have any idea of what those sub-functions might be, and that is okay. In any case, the project team should make every effort to identify the sub-functions that further define a function. Once these sub-functions have been developed, the function they define will now be complete. This is the same as the premise underlying the WBS architecture and is very intuitive. For many adaptive projects, additional sub-functions will be discovered as part of doing the project.

- **Process**—Complex functions and sub-functions can be further described with the business processes that comprise them. These are the business processes that are commonly used in today's organizations. To make them more understandable, the functions might be decomposed into sub-functions and the business processes that comprise the sub-functions then decomposed to processes.

- **Activity**—Activities are otherwise known as "process STEPs."

- **Feature**—At the lowest level of decomposition are features. These are the visible enhancements and characteristics of the entity that they describe. Think of them as cosmetic (i.e., authentication screen background design) and you won't be far off.

Note that not all decomposition levels are necessary for every requirement. Some requirements will be more comprehensive than others, and utilize all levels. The simplest requirement might be best described using only a Features list. The decomposition is subjective. In the final analysis, all that is needed is a decomposition that clearly describes each requirement.

The RBS will be useful as an aid in helping decide which strategy is best for the project management process to be followed, in other words, the nature of the project as viewed through its RBS. It is the best guide you will have to choosing the best strategy for managing the project.

If you get the RBS right, you are halfway home. That means we should pay particular attention to what is put into the RBS, and make sure you are not victims of scope creep. We will have enough outside influences to add to scope. We do not need to be party to that now.

Approaches to Requirements Elicitation and Decomposition
Requirements have to be defined through a carefully planned engagement with the client. Of all the requirement gathering approaches, I recommend six that work particularly well within the ECPM world. These are widely used methods for generating requirements. It is usually the case where more than one method is chosen to generate the requirements on a project. Selection of the best methods to generate potential requirements for the project is the responsibility of the project manager, who must evaluate each method for costs, ease of implementation, reliability, client comfort level with the chosen process, and risks. Further, selection of a particular method should be based on specific product and project needs, as well as proven effectiveness. Certain methods have been proven effective for specific industries and products. An example of this

would be using physical, three-dimensional wireframe models in product design or solid models in bridge construction.

Requirements elicitation is the first and challenging task that the project manager and client will face in the life of a complex project. To do this effectively is as much an art as it is a science. On the art side of the equation, the project manager will have to prepare the client to engage in the elicitation, decomposition, and documentation process. The attitude, commitment, willingness of the client to be meaningfully involved, and preparation of the client are major determinants in the choice of approach. This preparation will include the choice of approach to be used and perhaps some preliminary training of the client and the core team. Some clients will be open and proactive in participating; others will not. Some will be sure of their needs; others will not. Some will be expressing their wants, which may be very different from their needs.

On the scientific side are the many techniques that have been used successfully to decompose and document requirements. I have had good success using brainstorming, user stories, interviews, facilitated group sessions, prototyping, and requirements workshops. All of these should be in your ECPM/kit.

It is important to realize that requirements identification and decomposition are critical to understanding the direction of the project. It is now that the framework for the project begins to take shape.

The STEPs to generate requirements begin by looking at the business function as a whole. This is followed by the selection of a method or methods for gathering requirements. This effort must be planned. A few of the several approaches to requirements elicitation are shown in Table 2.1. These are ordered from least formal to most formal. These are usually understood or easily adopted in less sophisticated environments. (A good reference on methods for gathering requirements is Robertson and Robertson, 2012.). I have personally used and can recommend the following approaches to Requirements Elicitation:

- ➢ Brainstorming
- ➢ User Stories
- ➢ Interviews
- ➢ Facilitated Group Sessions
- ➢ Prototyping
- ➢ Requirements Workshop

These are listed in the order of least formal to most formal. I single out these six methods because they work best when trying to translate business requirements into business deliverables. Across the entire history of the ECPM, I have had the most experience and success with these methods. These methods can also be used to decompose requirements and generate the RBS. Regardless of the method you use to generate the RBS, I strongly advise creating an RBS for every project for the following reasons:

- ➢ The RBS is most meaningful to the client.
- ➢ The RBS is a deliverables-based approach.
- ➢ The RBS is consistent with the PMBOK.
- ➢ The RBS remains client-facing as long as possible.
- ➢ The RBS is the higher order part of the WBS.

Choosing a Requirements Elicitation Approach
There are several things to take into consideration when deciding which approach to take:

➢ **The experience of the client team**—If the client team has memorable and effective experience with any of the requirements gathering approaches, try to select from among them. To the most extent possible, you should put the client in their comfort zone so that they can focus on the work of defining requirements.

➢ **The experience of the development team**—If the development team has memorable and effective experience with any of the requirements gathering approaches, try to select from among them. Given the choice of two or more approaches, choose the one that favors the client.

➢ **The complexity and nature of the project**—The more complex the project, the more you would want to use approaches that give detailed information and are less likely to overlook anything. A formal process should be preferred to an informal process.

➢ **The experience of the session facilitator**—First of all, the session facilitator should not be a member of the client team or the development team. This may come as a surprise, but there are good reasons to back it up. The facilitator's job is so critical that you need someone with experience and with no bias toward the project. Their job is to facilitate, not politic. The client team leader and the development team leader need to focus their attention on the deliverables from the requirements gathering exercise, not on the process of getting them, and so they are not good choices. If there is no one internal to the organization that meets the criteria, hire an outside consultant. This is no place to cut expenses. The more critical and complex the project, the more you should favor the use of an outside facilitator.

Elicitation and Document Requirements

Complete and clear document requirements at the beginning of a project have never really happened. It just isn't possible, except in the simplest of projects. (Infrastructure projects are an example because they tend to be isolated from the outside world.) A few "cowboys" would claim to have done so, and launched into project planning under the assumption of having a complete requirements document. Later, to their dismay, they are deluged with scope change requests from the client: "What happened? I thought we had all of this nailed. You told us you were satisfied and that we had done an exemplary job of gathering and documenting your requirements." The problem is not with the process. The problem is not with the initial documentation. The problem is that the world is not a static place. It never has been and never will be. So, why should you expect your requirements document to stand still while you do the project? Change is inevitable, regardless of how well we did at the outset. There must be better ways. And there are!

The RBS is the major input to help you make the decision as to which category of project you have, and which PMLC model would be most appropriate for managing the project. I will show how the RBS can be used to help the project team decide which strategy, among the five major project management categories, should be chosen and under what circumstances you should use each one. The strategy that you choose then becomes the infrastructure on which you will choose a project management model and build your project plan. The status of the RBS relative to its completeness can be used as the measure of progress towards the solution.

The completeness and clarity of the RBS present you with two critical decisions as to which of five major directions to go (linear, incremental, iterative, adaptive, or extreme). Within that choice is which specific PMLC model will be used. In this book, the chosen direction is down the adaptive road, the ECPM road. As you will see, these decisions are not obvious. While there is some objectivity involved, the decision process leans heavily towards the subjective side.

I advise creating an RBS for every project because:

- ➢ The RBS is most meaningful to the customer.
- ➢ The RBS promotes customer ownership and eventual buy-in of the solution.
- ➢ The RBS is a deliverables-based approach and in the customer's comfort zone.
- ➢ The RBS can be used to measure progress towards solution definition.
- ➢ The RBS can be used to measure project status.
- ➢ The RBS is consistent with the PMI® PMBOK.
- ➢ The RBS remains customer-facing as long as possible into the planning exercise.

The situation depicted in Figure 3.2 is all well and good, if you happen to know the complete RBS. If you don't, you have a problem. In complex projects, an incomplete RBS is the rule rather than the exception. It would be unusual to have a complete RBS at the start of a complex project. Some functions and features may not be known, and their absence may not be known at this early stage, either. Being able to say that the RBS is complete is based more on a feeling than on hard fact. The ECPM is designed to learn and discover the complete RBS, and hence the solution, through iteration.

> **Conventional wisdom says that a complete RBS is not possible at the start of a complex project, but can only be defined through an iterative process. There may be exceptions for projects that are often repeated.**

So far, we have defined requirements from the perspective of what those requirements have to do. Functions and features offer us the details of that definition. Given that understanding, our requirements admit a structure much like that shown in Figure 4.8. For those of you familiar with the WBS, you will see that this is quite similar to a functional-based WBS. It will be the basis on which you decide how to structure the project management approach you will use for a project with this type of RBS (the reference here is to complexity, completeness, and uncertainty of the RBS for the project at hand).

PUTTING IT ALL TOGETHER

Requirements Elicitation is the heart of any effective complex project management approach. Change is inevitable and the project environment dynamic. It can change at any time and in unexpected ways and it directly impacts requirements. The only steady state in all of this change is the Business Case that initially was the justification for authorizing the project. The alignment to that and the expectation of the validating business value being realized is the justification for continuing or modifying the project.

To the extent possible the requirements infrastructure must be such that it brings as much stability to the project as is possible. The definition of a requirements as provided by the ECPM Framework delivers that stability. The iterative definition of the RBS is the enabling tool.

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