

Mastering Software Project Requirements

A Framework for Successful Planning,
Development &
Alignment



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The Evolution of Requirements on a Project

Requirements evolution is really the shaping of the requirements through the life cycle depicted in Figure 3.1. This life cycle consists of a set of stages and tasks that generate specific artifacts and deliverables, which contribute to both the successive stages and the final set of validated and accepted requirements.

In general, requirements evolve out of scope to the high level, further evolve to the mid level, and finally down to the low level. This process is much the same for any other refining process that exists today, such as distilling liquids, sifting solids, and refining oil. By going through each of these processes, as illustrated in Figure 3.2, the larger and cruder elements are refined into more granular products with a variety of applications. The application itself varies, dependent on the type of refining and the minerals extracted.

The reason for an evolutionary process in requirements is simple: in software and systems development, the project team is transitioning from a vague concept to a fully formed and detailed solution. This transition requires an evolutionary process. Requirements start as a vague intangible concept and evolve to become a clearly articulated set of specifications. In order for this to happen, some of the commonly used industry tools, techniques, and templates have been adapted. They have been enhanced and quantified, given priority and context, and new tools and techniques have been added.

INHERENT PROJECT RISKS TO REQUIREMENTS

There are inherent flaws and risks to requirements, which come from both project inception and the individual resources that support this project during its

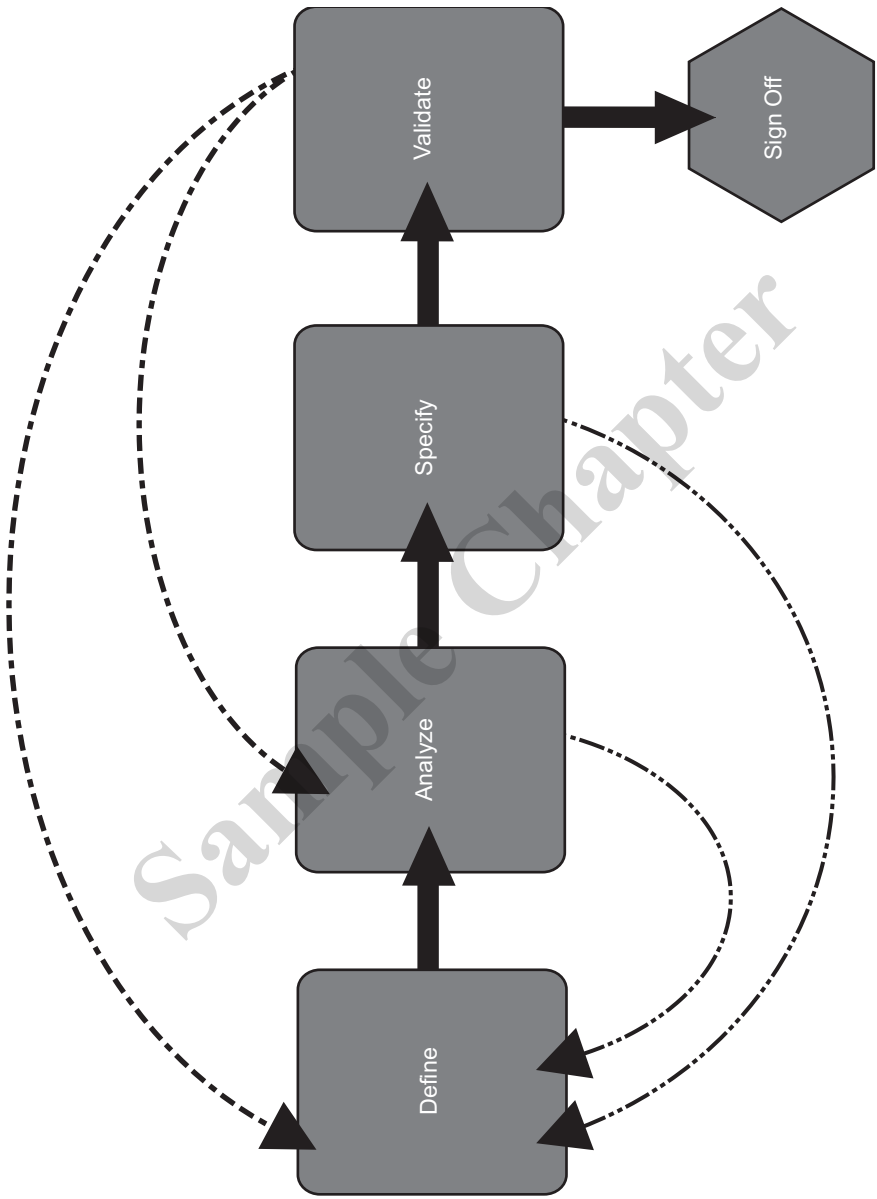


Figure 3.1 Requirements development life cycle

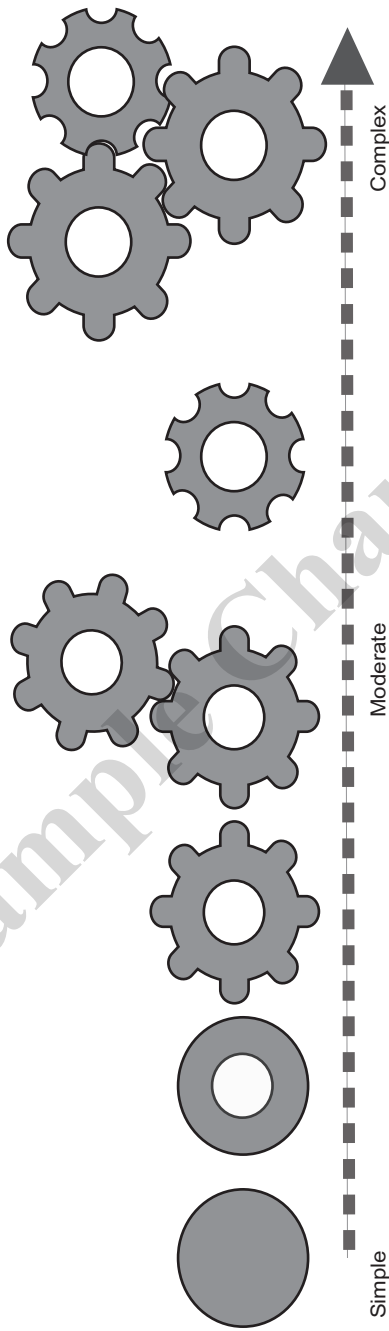


Figure 3.2 Structural development over time

life cycle. Make no mistake; both are actually risks. Each of these two elements of risk adds considerations for requirements activities. These must be managed appropriately and kept in check in order for the final solution to be well designed, built, and implemented.

Risks from Project Inception

The problems encountered during requirements activities are just as deterministic as the product defects that result from poor requirement quality. By the time requirements activities are underway, there have been so many other little things—which have often been overlooked, assumed, or done improperly—that poor requirements are a natural result. Unfortunately, much of the inherent risk comes from incomplete project inception, which leads to issues down the road. Risks from project inception include incomplete strategic planning of business architecture and mismanaging expectations.

Strategic Planning of Business Architecture

A big part of planning, which prevents runaway projects, is determining the details of the solution and context. Those are how the project team will deliver the best solution for the business problem, and how this solution fits into the surrounding business architecture. For many companies, this context has an impact on the outcomes of the project. These include:

- The alignment of the solution to strategic goals
- The decision about how to resolve a specific problem or to evolve the business
- Making the crucial build or buy decision
- Determining high-level resourcing decisions for the project

Strategy is really about figuring out how to connect all of the impacted systems and components, tools, and resources in a dynamic way to achieve both corporate and project goals. At the same time, it is about determining what will make all those parts move in unison towards those goals. Unfortunately, many projects include little consideration during project inception. For business architecture it is assumed that these considerations were either made by the business already or will be made as the project progresses. The problem is that this assumption is often incorrect. When the business makes the decision to initiate a project, the architecture and the full extent of the solution, within the context of that architecture, is often limited at best.

When the decisions are left to the project team, this expectation is not always communicated. On top of this, many project teams and analysts are taking the lead for solutions from the business. Unless resources on the project team ask

specific questions, key information about business architecture may get overlooked. Finally, many businesses may look at both the problem and the solution with “tunnel vision.” They may consider factors outside of their own purview as unnecessary and overlook critical elements of business architecture. This can have adverse impacts on the requirements development and deliverables. The key to solving this issue is to ask the right questions of the business about architecture. This is the crucial aspect that will enable the project to fill in all information gaps and generate a complete solution, which will fit seamlessly into the business architecture around it.

Managing Expectations

Far too often, project managers and business analysts do not set and manage realistic expectations with the business sponsors, stakeholders, and user community during project inception because those often impact scope and sales issues. Unfortunately, the lack of expectation setting and management can lead to the creation of an incomplete understanding of the solution and ultimately, to incomplete requirements.

The lack of expectation setting and management leads to incomplete solutions because this key component is actually an indicator of the health of the communication lines, which exist between the project and the business teams. Without communication, there is a lack of user involvement, the wrong things get built, the project has excessive changes and scope creep, requirements are poorly developed, and the whole thing is delivered beyond the schedule. The process of setting and managing expectations is more of an underpinning or a foundation upon which the project is built. With great management of expectations, the team works as a cohesive unit and is capable of recovering from a diversity of project issues and challenges. The key to setting and managing expectations is communication. Communication enables the team members, sponsors, and stakeholders to convey their expectations at the outset (setting expectations). And communication enables the team members to address changes to those expectations and negotiate those changes with the sponsors and stakeholders.

While expectations are set at the start of the project, they are managed throughout the life cycle. As such, there are many factors impacting them, and many nuances and intricacies involved in managing them. These factors include:

- Having open discussions at all stages and under all conditions and circumstances during the project
- Keeping communication lines open throughout the project life cycle
- Conducting communications and escalation planning
- Planning for communication in crisis situations
- Using the same language as the business when communicating with the business team

- Demonstrating consistency of messaging across all project team members
- Reinforcing the project mission throughout the life of the project
- Demonstrating cohesiveness of the project team

Together, these factors contribute to the creation of a solid architecture. This communication architecture enables incoming and outgoing communication across the project and supports the establishment and ongoing management of expectations.

Communication Architecture

Communication architecture is a formal framework for all project communications. Since effective communication is the foundation of a successful project, it cannot be left to chance or an ad-hoc activity. This architecture encompasses change strategy, communication infrastructure, outgoing channels, and input funnels.

- Change Strategy
 - Top-down, Bottom-up
 - Inform, Involve, Evolve, Maintain, Observe
- Communication Infrastructure
 - RACI
 - Communication Plans
 - Project Reports and Logs
- Channels
 - Website and Project E-mail Informational Activities
- Funnels
 - Website and Project E-mail
 - Point of Contact

Risks from Project Resources

Project resources bring their individual personalities, needs, and baggage to the project. All of these must be managed in order to support requirements development activities and to reduce the risks of inherent issues creeping in to the point that there are serious quality issues. These resources potentially bring one or more of the following to the project: ego, an inability to clear their own personal beliefs and biases, an inability to separate opinions and assumptions from fact, and scotoma (a blind spot, or an inability to perceive something within the field of vision).

There are many times when ego plays a significant role in the ability or perceived ability to complete a task. In the case of requirements, ego is a barrier to those business analysts who either come in to “save the day,” or those who come

in believing they are not good enough to complete the task. In either case, ego becomes a communication barrier and prevents the business analyst from being able to get the requirements done with any real degree of accuracy.

It is important that business analysts clear away both their own perspectives and those of others who will contribute to requirements. Unfortunately, many people have an inability to clear their personal beliefs and biases and get to the heart of the business need. This is especially obvious when subject matter experts are involved and make assumptions based on their own experiences.

In addition, many people have an inability to separate opinions and assumptions from fact. When it comes to requirements, business analysts can literally run around working on the wrong requirements and end up making change after change to the requirements.

Finally, the inability to perceive is called “scotoma.” It is actually a medical term which refers to the naturally occurring blind spot which every person has. In requirements, it occurs when the analyst has been working too closely with the content and the subject matter to see the real issues within the documentation. The analysts who review their own work, and do not seek multiple peer reviews, will miss details because their brain fills in the gaps of what should be there when in fact, it is missing.

5 CRITICAL REQUIREMENTS STEPS THAT GET MISSED: WHAT BUSINESS ANALYSTS ARE NOT DOING (CONSISTENTLY)

The lack of professional formalization means that there is no single tried and true set of business analysis best practices. There are indeed some commonalities, but without a standardized set of best practices, there can be no real assurances that enough has been done to ensure that business analysts have captured the right requirements for the right products. This is exactly where the information technology industry gets statistics illustrating that only 20% of features are used all the time and a whopping 40%¹ are never used!

Over the years, I have worked with, mentored, trained, managed, and interviewed hundreds of business analysts. Nearly all of those analysts miss critical steps in requirements. Understand one thing: this does not make these people bad analysts, or even unqualified. They are missing these steps because business analysis is still a collective practice and not a formal profession with standardized tasks, metrics, and tools. Many of the analysts are simply borrowing tasks, tools, and techniques from other development areas.

So what tasks could your business analysts be doing that can change all this? These tasks are research, gap assessment (vs. gap analysis), ambiguity

management, requirements validation (including facilitated sign off), and quantifying the effectiveness of requirements activities. More importantly, how can the project manager or the business teams determine whether business analysts are not doing these tasks? It is important to examine each of these to understand what they are, what they look like, and what the direct quantifiable results are. Then, and only then, will it become obvious whether these tasks are necessary and are actually being done.

Research

There are a lot of components which need to be understood in order to build accurate requirements, and only one is user input. Going to the users should be the *LAST* task a business analyst (BA) does in requirements elicitation, yet when interviewed, the single-most common answer to how requirements are determined is “I go to the user.” The fact is that there is already a lot of detailed information contained within the project documentation, existing application, and environment documentation. The BA needs to study this and understand the business problem, goals and objectives of the project, scope, the environment the new application will reside in, and how it will interact with and impact other applications within this environment. By the time the user gets involved, the BA should already have a draft of context diagrams, workflow, requirements management framework, peripheral gap analysis, a high-level draft of requirements, and a plan of how they will accomplish the work on this particular project.

Gap Assessment (Versus Gap Analysis)

Gap analysis is a small sliver of the work comprising gap assessment. Where gap analysis studies individual gaps on a given project, gap assessment takes it further and manages gaps in the same way that issues would be managed, assesses risk and impacts, and draws links between gaps and the areas impacted by those gaps.

Ambiguity Management

Ambiguities are a common part of life. How many people in the nineties could program the clock on their VCR? Ever read the directions for putting together a new toy or piece of furniture? Have you ever had a conversation with someone and gotten the wrong message? All too often, people speak before listening and listen without hearing. In writing, the human brain completes thoughts that are not there. In general, people also forget to look at things from other perspectives and get feedback from others. In requirements, this creates ambiguities. Evidence suggests that ambiguities are the leading cause of low project success rates, missed functionality, and unused features. In a nutshell, ambiguities are risks!

The only way to ensure that ambiguities in requirements are exposed and addressed is to devise a solid process for ambiguity management, which is comprised of a set of clear steps dealing with each of the reasons that ambiguities exist. Further, ambiguities as risks must be managed in the same way risks are managed throughout the project to reduce their occurrence and mitigate their impacts and effects.

Requirements Validation

During the nearly one thousand interviews I have conducted, I always ask the candidate how they validate their requirements. Again, 99% say they “go back to the user” and are completely stumped when I ask them what they do when the user doesn’t know. There are lots of proven tools and techniques available to support validation. The analyst usually just doesn’t know how to apply them to achieve the best result. They cannot see the value of using them when they are not sure how the tools work and how they will impact the quality of their work.

Egos aside, candid conversations with business analysts tell me that almost everyone is struggling and learning by the seat of their pants. This is a direct result of the lack of practice formalization. Very few analysts will come out and say it. Every person wants to have a level of job satisfaction, to feel competent, and to be seen as competent by colleagues. This means that business analysts are not necessarily going to ask for help and advice on which tools and techniques should be applied in order to validate requirements.

Evidence of this problem can be found by looking at the numbers of projects with scope creep within a given organization, users and stakeholders who are complaining about missed functionality, and development time or break-and-fix cycles that exceed estimates by wide margins. If these patterns exist, the best advice is to work with the business analysts to educate them and to bring in a formal methodology that encompasses specific validation techniques. Any methodology without a specific set of validation steps is incomplete and not worth the money spent on it.

Facilitated Sign Off

Thorough requirements validation requires something that some business analysts are actually doing but not necessarily doing well: facilitated sign off. Countless business analysts (including the most senior) have asked me how to get stakeholders to read the requirements document. Despite all of the unknowns, this is one of the most significant challenges facing an analyst.

I have to share that I assume stakeholders will not read the requirements document, even though I give them time to do so. I also assume that those who do read it generally do not read it thoroughly enough to understand the details.

This is okay. I do not need them to. I do need the stakeholders to understand the functionality represented by the requirements. The best way for them to really understand the functionality is to participate in a facilitated walk-through of the functionality and sign off on it.

Think about it this way, if an average person who is not mechanically inclined wants to buy a car, do they need to know every little detail of how the car works in order to buy it and make effective use of it? No. The same is true for software. Business users need to know the features and main functions and not necessarily every tiny little detail about how the application delivers its results. They only care that it delivers results and when it does not, there is someone who can fix it.

Quantifying Effectiveness of Requirements Activities

The final step business analysts miss is the compilation of quantifiable metrics associated with requirements, which illustrate the effectiveness of the requirements activities. It is one thing to recognize that requirements need to change and improve and completely another to target exact areas for improvement and understand the degree of improvement needed. There is a great deal of controversy on requirements improvement and traceability, but there does not seem to be much discussion about how to measure and quantify those improvements.

In order to understand what aspects of requirements need to be improved, the organization must approach improvements in the same way they would approach any other process improvement project. They must determine the kinds of metrics that can be gathered for requirements; then they must analyze those metrics to determine the starting point (the benchmark). Setting a benchmark allows organizations to illustrate the current situation and to determine both the levels and the types of professional development the business analysts will need. Establishing future milestones provides organizations with the ability to perform a comparison at various points during the improvement process and supports the analysis of the effectiveness of the improvement efforts. In order to do this, it is important to understand the tools that will provide the metrics to be used for assessing requirements. Some requirements tools will come with built-in metrics for traceability, but a single tool, which will compile a full set of standardized metrics to support a true requirements improvement initiative, has yet to be developed.

By comparing the metrics of individual projects across the organization, specific opportunities for improvement will become apparent. In fact, this understanding of organizational requirements effectiveness will enable targeted areas of development for the business analyst team, improved collaboration between project teams, and support organizational agility.

All in all, missing any of these critical steps not only increases the risks the project will face but also will add to development and maintenance costs and decrease the overall return on investment (ROI). On top of this, the team will not have the detailed information required to support focused requirements remediation efforts. All of this translates into a reduced ability to support the core business of the organization, as well as an inability to remain innovative.

THE GOLDEN RULES OF REQUIREMENTS

In order for business analysts to achieve real success with requirements, they must follow a basic set of “Golden Rules.” These simple rules are as follows:

1. Identify and define objectives
 - Objectives explain WHY the system is being created
 - Qualified objectives identify the desired goals, or ROI, and specify constraints
2. Verify the requirements against the objectives
 - Validates accurate scope for high-level requirements
 - Assures consistent focus for application rules
 - Provides critical management tools for scope change decisions
 - Repeats verification for every iteration of the requirements and design documents
3. Apply scenarios and use cases against the requirements
 - Mapping the requirements flow in a simple set of scenarios and use cases could expose gaps or ambiguities in requirements
 - A scenario represents the possible actions performed by the user, by asking: “what if the user does . . .”
 - A use case represents a task-oriented user view of the system and a full end-to-end unit of work, where the user could be a person or another system that interacts with this system but is outside the scope of this system
 - Applying scenarios and use cases assures valid usability and that requirements are detailed enough to handle all possible use cases and scenarios
4. Perform a consistency review
 - If one person wrote it with a specific intent, and another person reads it differently, it is ambiguous.

ATTRIBUTES OF GREAT REQUIREMENTS

While requirements may differ from analyst to analyst and project to project, there are specific key attributes, which demonstrate a high degree of requirement quality. As illustrated in Figure 3.3, these attributes are:

- Unambiguous—Understood by the reader as intended by the writer
- Deterministic—An outcome that can be predicted because all of its causes are either known or are the same as those of a previous event
- Concise—Uses exacting words to relay a very specific message
- Explicit—Uses specific, detailed descriptions to relay the exact message
- Consistently Worded—Utilizes consistent terminology and framework

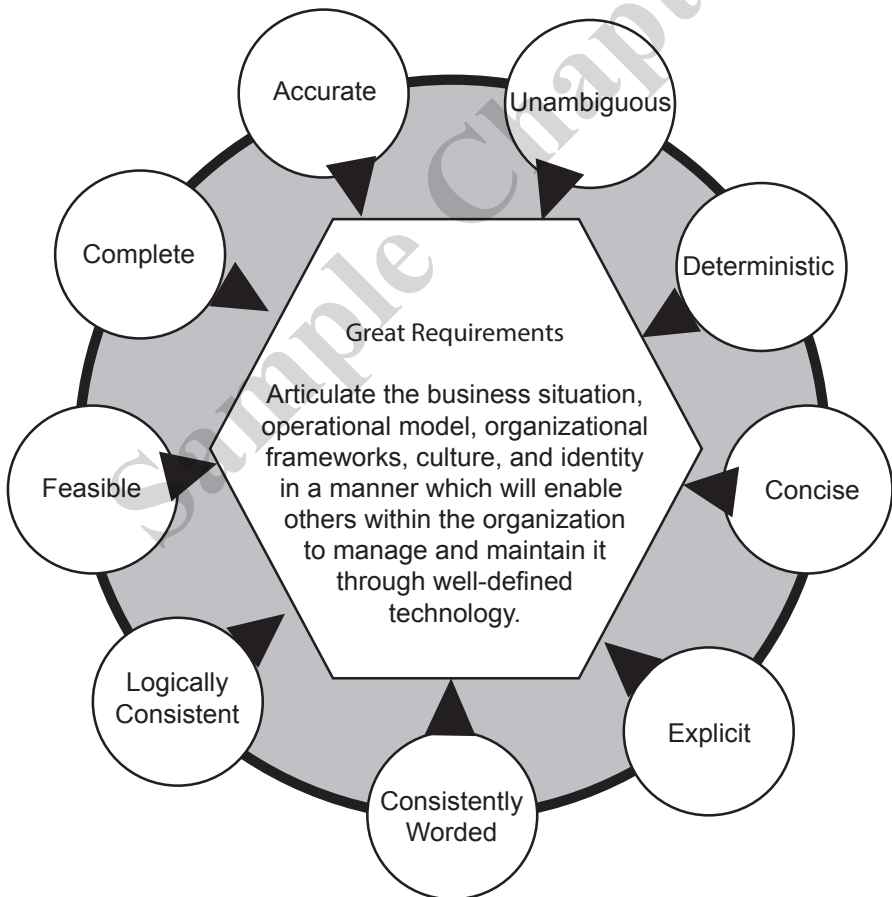


Figure 3.3 Attributes of great requirements

- Logically Consistent—Follows a logically consistent path from start to finish with no missing data or elements at any point throughout the process
- Feasible—Practical, that is doable, from business, technical, and testing perspectives
- Complete—Contains enough detail to convey what the new system must do under all circumstances
- Accurate—Identifies the *right* requirements to meet business goals, drivers, and needs

REFERENCE

1. Cook Enterprise Corporation, 2009, “Building Requirements Consensus,” at <http://www.building-requirements-consensus.com/>.



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