Toward Requirements-Driven Acquisition

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Rigorous requirements definition and tracking have proved their worth in many successful projects. Rigorous attention to requirements should also be the basis for any acquisition.

There's nothing new about requirements-driven processes. They are recognized and appreciated as a successful foundation for projects across many disciplines and organizational environments. Requirements analysis solidifies fuzzy objectives and serves as the link between performance and measurable criteria.

For some reason, however, appreciation for the vital role of requirements analysis has failed to extend to many government acquisitions. Few procuring organizations view requirements as a foundational basis for successful acquisitions; rather, they allow the acquisition *process* to dilute the acquisition *product*. This practice persists despite the direction of the Office of Management and Budget (OMB)[1] and other oversight organizations, which continue to emphasize the necessity of a requirements-driven process in conducting acquisitions. Procuring organizations are frequently overwhelmed by the volume and intricacy of acquisition regulations and thus tend to concentrate on ensuring that the required acquisition steps are followed. Ultimately, this means that the acquisition regulations drive the acquisition and the procuring organization might end up with a vendor that can't deliver what they need. The best way to ensure that this doesn't happen is to incorporate requirements analysis as an integral component of the procurement process.

Reports of failed acquisitions are often directly traceable to poorly defined requirements. The Federal Bureau of Investigation's Virtual Case File project is an example. Begun in 2001 and abandoned in 2005, the project lost $100 million of $170 million spent. An Inspector General's report specifically listed poorly defined design requirements as a major shortcoming.[2]

Inside Track

- High-level strategic requirements can form the baseline for iterative refinement and exposition as an acquisition unfolds.
- Preliminary requirements analysis forms the basis of a strong and well-supported business case, providing direct evidence of the project's value.
- The fusion of the procuring organization's experience and business knowledge and the contractor's specialized solution experience yields the most effective requirements.
- Governance mandates drive requirements and can form the basis for useful templates and checklists.

Such results should be strong incentive for making a rigorous requirements-driven process the basis of every acquisition.

Early and iterative

Most project management experts agree that requirements identification is a vital first phase of any properly planned and executed project. This activity can occur at several points within the project cycle, depending on the specific project, but most requirements are best defined before detailed planning begins. Preliminary requirements analysis forms the basis of a strong and well-supported business case, providing direct evidence of the project's value. Performing this activity early in the project lets the project team identify risks, as well as the project's stakeholders and necessary communication paths—all critical inputs to planning activities.

As Figure 1 illustrates, requirements are the basis for activities across the acquisition cycle. Early requirements definition supports strategy development and planning, deepening the understanding of the effort at or near the beginning and forming the baseline for iterative refinement and exposition as an acquisition unfolds. These high-level requirements are sometimes thought of in terms of objectives (What are we attempting to accomplish?).

Where Requirements Come From

How do you handle requirements development when you have neither domain expertise nor experience developing proper requirements?

One approach is to establish the as-is environment, which simply involves asking the potential users of the system or service as many questions as possible: What do you do? How do you do it? What systems do you use? With whom do you perform your tasks?

The answers to these questions and the subsequent refinements and iterations become your requirements. Capturing these answers in diagrams and process flows can form the basis for very effective requirements documentation.

Unfortunately, the completion of these high-level requirements is often the point at which many acquisition teams stop thinking about requirements. This early stage should be only the beginning of iterative requirements refinement, carrying the team through subsequent acquisition stages and into post award.

A modified paradigm

Given the acquisition environment created over the last decade by the President's Management Agenda, A-76, and the Lines of Business initiatives, government agencies no longer truly have a make or buy decision. These initiatives demonstrate the need to begin acquisition activities at the project's outset.

Table 1 shows the requirements activities in the five acquisition stages described in "Acquisition in the Large: Looking Ahead at Every Stage" on p. 4 of this issue. One of the first activities, done as part of the *strategy development* stage is requirements identification. The team must begin to document the business, technical, security, and user requirements that will form the basis of the solicitation package and culminate in a successful contract award. At project initiation, the team might have established high-level goals, but there is no real sense of what is required. Requirements identification helps to define the boundaries of the project as well as the end state.

Requirements evolution

During the *planning* stage, the identified requirements are now distilled into easily conveyed needs and objectives. Giving greater substance to the requirements early in the acquisition cycle forces the team to confront difficult questions. Answering these is important because requirements ultimately support and define the acquisition's goals. Because requirements identification occurs early in the cycle, the acquisition team has time to thoroughly vet the requirements, disseminate them properly, gather feedback and additional input from stakeholders, and proactively clarify questions and issues. All these activities should be an integral part of acquisition planning.

If the acquisition is to be performance-based through a statement of objectives, high-level requirements might suffice, although there must be enough detail to support source selection. In developing a statement of work for a solicitation, however, high-level requirements are usually not enough. The acquisition team must supplement or transform them as necessary into detailed requirements—what acquisition veterans know as "the system/contractor shall ..." statements.

In preparing detailed requirements, the team can follow one of many suitable processes and methodologies, including the use of declarative statements or use cases.

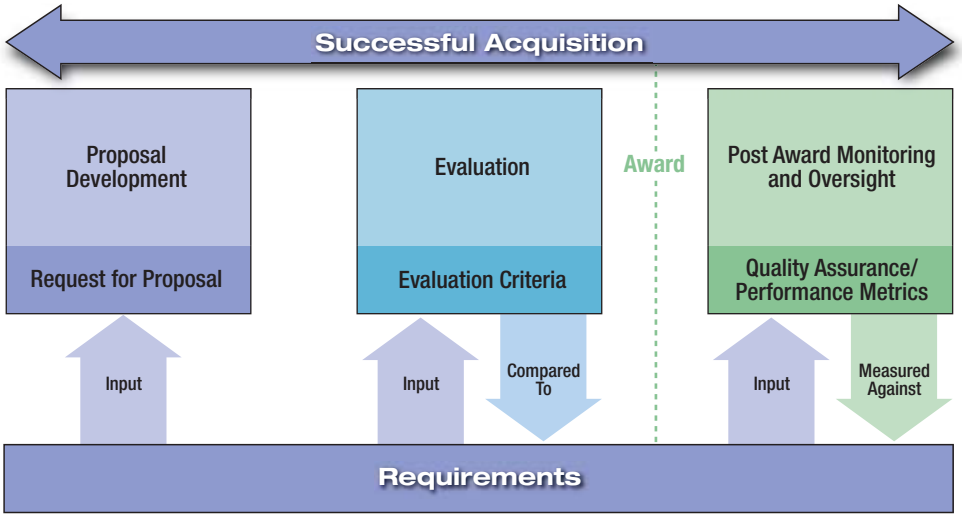

Figure 1. How requirements continue to influence acquisition stages. Although many acquisition efforts look at requirements as part of planning, requirements have a strong role in later stages as well. In the request for proposal stage, requirements are valuable input, in the evaluation stage they are both input and a basis for developing evaluation criteria, and in the post award stage, requirements become both input and the barometer for the project's performance.

Table 1. Requirements activities throughout the acquisition cycle.

Acquisition Stage	Requirements Activity	Purpose
Strategy development	High-level requirements identification	Initially document business, technical, security, and user requirements
Planning	Continued requirements identification and definition	Distill requirements into easily conveyed needs and objectives
Request for proposal	Detailed requirements transformed into acquisition documents	Articulate requirements clearly enough to elicit meaningful offeror responses
Evaluation	Use of requirements as evaluation criteria	Use requirements as the baseline against which proposals are evaluated
Post award	Requirements validation and discovery and performance measurement	Coordinate with awarded vendor to ensure complete understanding of requirements and new requirements discovery as necessary Use requirements as the baseline for evaluating vendor performance

If the team starts transforming high-level requirements to detailed ones as early as possible, the procuring organization will have enough time to conduct proper reviews, audits, and other activities.

At this point, the detailed requirements become the basis for the solicitation package as the acquisition moves into the *request for proposal* (RFP) stage. Requirements should include functional and technical needs that a vendor can directly respond to and an evaluation team can easily verify. When crafting requirements, the team should take care to articulate concepts clearly enough to enable a clear response from the offerors. Properly developed requirements translate directly into the RFP, typically as Section C.

Requirements from the early stages should flow seamlessly into the statement of work; source selection plan, including the evaluation criteria; and post award monitoring and oversight plans. Requirements must be tightly integrated with source selection and post award processes.

The receipt of proposals signals the beginning of the *evaluation* stage. Requirements form the basis of evaluation criteria as established in the source selection plan. The evaluation team reviews and evaluates proposals through the requirements lens. This is the stage at which early requirements work begins to pay off. Because the procuring organization knows what it wants, it can more accurately choose a contractor to implement the best solution. By taking time to tightly integrate requirements with source selection, the team has developed a source selection plan that details the basis for measuring each offeror's ability to deliver on the requirements.

Post award

In the *post award* stage, the team validates the original requirements and conducts additional efforts to discover new ones. It might seem odd to return to requirements identification and development at this late stage, but the contractor generally brings a complementary set of capabilities to the project. These new capabilities either validate existing requirements or serve as motivation for updating requirements documentation. It is this fusion of the procuring organization's experience and business

Cost and Price Requirements

– Jill A. McCoy

The quality of the price proposals received will be only as good as the quality of the price requirements and instructions included in the solicitation package. Any effort to make sure this information is clear early on is time well spent. Including clear price requirements, guidelines, and information for submitting cost and price data can help ensure that offerors submit price proposals properly with a minimum of errors. The evaluation team can more easily determine price reasonableness and cost realism, the evaluation runs more smoothly, and there is less overall cost risk to the contract.

When the acquisition team puts together the price requirements section of the solicitation package, it must ensure that pricing requirements and guidelines are crystal clear and in enough detail to ensure a proper price proposal. The requirements must reflect the essential information for evaluation and contract award. The procuring agency cannot do an apples-to-apples comparison when evaluating price proposals unless the price requirements are specific and clear.

Essentials checklist

Certain pricing requirements should be in any price proposal so that the evaluation team can determine price reasonableness and cost realism. These requirements include but are not limited to

Overall total cost. Cost to perform the required work by contract line item number and subcontractor line item number for the performance periods.

Direct and indirect labor costs. Labor hours, rates, performance periods, and cost by appropriate labor category. The offeror must also provide the same type of information for subcontractors.

Direct and indirect materials. Raw materials, part numbers, components, descriptions, quantities, performance periods, and price.

Other direct costs. Travel, services, packaging and packing, and nonrecurring costs.

Indirect cost. Overhead and general administrative cost (G&A).

Profit or fee. Dollar amount over and above allowable costs paid to the contractor.

Cost/price assumptions, conditions, and exceptions. It is essential to clearly document these.

Pricing documentation basis. Support each price/cost element proposed.

Pricing data. Data must be accurate, complete, and current.

Pricing tables. Populated pricing table templates provided as spreadsheets or a database.

Additional information

In general, if the price competition is adequate, the procuring organization should not require offerors to submit information other than cost or pricing data as stated in the Federal Acquisition Regulation (FAR 15.402). However, the contracting officer may require additional necessary information, such as pricing methodologies, vendor quotes, and other data that shows the basis for establishing price reasonableness and cost realism. This information may be required any time before the end of negotiations, especially if the procuring organization expects (FAR 15.403 and 15.404-1(d))

Elements of a Good Requirements Statement

A common pitfall in requirements statements is poorly conceived and written requirements. A good requirements statement is

Clearly written. It uses a positive statement, such as "the system shall …" with clearly defined terms and explanation.

Testable. Its statements can be measured against criteria and judged to pass or fail.

Singular. Each statement has only one item. All too often, organizations include an "and ..." in the definition. For example, the requirements statement that "the system shall meet security and OSHA regulations" should be broken into two separate requirements: (1) "The system shall meet security regulations" and (2) "The system shall meet OSHA regulations."

Traceable. It provides enough information for someone to trace the requirement to its source.

Several other criteria are commonly associated with good requirements statements. Both the IEEE (Standard 830-1998) and the National Aeronautics and Space Administration's Software Assurance Technology Center (http://satc.gsfc.nasa.gov/support/index.html) offer advice on how to draft effective requirements statements.

knowledge and the contractor's specialized solution experience that yields the best solution requirements. This requirements set then becomes a work product that anchors the rest of the project.

Once the project is underway, the acquisition team must be able to measure the contractor's performance. There should be a quality plan that describes how to use specific performance measurements, which the team can evaluate against the already defined requirements. The team and governance bodies can then audit progress toward meeting these criteria throughout the contractor performance period, including into post-implementation review, with an eye toward process improvement.

In the later acquisition stages, particularly post award, the requirements are a truly objective standard for measuring project progress and success. The team can vet all gates between project phases and work products against the requirements set to determine if the project is on track. Having formally vetted and approved the requirements up front, achieving consensus on project success as measured through requirements fulfillment with stakeholders and management becomes a smoother and simpler undertaking.

Post-project review can form the basis for follow-on work, relying on identified changes to requirements, extensions of what is needed, or discovered gaps in what was accomplished. The team should always document project successes and failures as part of collecting data for future project planning and as part of a lessons learned effort.

Creating realistic requirements

Given their critical importance in projects and acquisitions, defining realistic requirements might seem difficult. In reality, the task is largely one of common sense. Three core guidelines can serve to frame requirements-defining activities.

- to purchase commercial items noncompetitively;
- to receive a single offer and not be able to determine price reasonableness for certain elements;
- to receive competitive offers, but because of technical differences does not expect to be able to determine price reasonableness;
- to receive competitive offers, but all offerors might not understand new requirements resulting in a cost-realism risk; or
- to receive competitive offers, but has concerns about performance quality resulting in a cost-realism risk.

As stated in Section 808 of Public Law 105-261, an offeror that does not comply with the requirement to submit additional information to the contracting officer to determine price reasonableness or cost realism is not eligible for contract award unless the contracting officer determines that it is in the procuring organization's best interest to award the contract to that offeror. This could occur if obtaining the additional information requires excessive effort, if the need for the item or service is immediate, or if the procuring organization could suffer significant harm if an award is not made.

Reducing cost risk

Offerors can underestimate or overestimate the price and cost of the actual requirements if the requirements are not clear, inadequately described, not tightly specified, conflict with other documents and provisions of the solicitation package, or are excessive or impractical. If the offeror underestimates a task's complexity or magnitude, the estimated cost will end up being far below the probable cost of a successful contract performance. Also, the more complex the task, the more likely pricing errors will occur.

Procuring organizations can reduce the risk of such errors by ensuring that the items being priced in the price requirements are consistent with the technical requirements. If these two requirements sets are not consistent, the offeror could submit a price proposal that does not align properly with the expected technical services or products delivered.

Figure A summarizes the four essentials when developing solicitation package requirements to reduce overall cost risk. The total cost that an offeror proposes represents the offeror's understanding of the contract requirements. Even with responsive well-defined contract requirements, misunderstandings and varying interpretations are inevitable. If the requirements are actually impossible to perform, conflict, or are widely open to interpretation, the procuring organization is at risk of encountering both unacceptable contract performance and high costs.

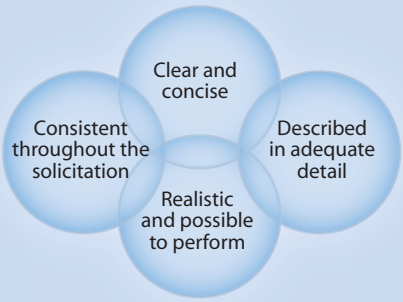

Figure A. Four essentials when developing solicitation requirements to reduce overall cost risk.

Begin with existing documentation. This can include policy as well as procedure documents. Previously generated acquisition documentation can serve as excellent templates and idea generators and help the team understand the assumptions underlying earlier decisions. The procuring organization should involve in-house subject matter experts to validate the requirements, ideally through staff process and functional interviews. At this point and perhaps throughout these early steps, the information technology (IT) organization should be a strategic project partner for any project that deals with systems or IT infrastructure.

Don't reinvent the wheel. The procuring organization should already have relevant documentation, such as enterprise architecture diagrams, that the team can use to determine the project or acquisition's alignment with approved agency standards or to identify the need for an exception to those standards. Useful documentation formats already exist, including use cases and the Unified Modeling Language. Either of these is an excellent way to capture and model system or business interactions, inputs, and outputs, and both have the strong advantage of providing a common language between business and technical stakeholders. Standard ways of performing customer needs assessments include interviewing users and management that the project will affect. Such interviews serve to distill requirements and ensure buy-in.

Be familiar with governance mandates. Governance mandates, such as those listed in the sidebar "Requirements Mandates," are often a sound basis for useful (and reusable) templates and checklists. Using such checklists can be part of ongoing process improvement. The team should not hesitate to leverage an acquisition contractor's experience and application or process documentation. The Federal Acquisition Regulation (FAR) even suggests doing that:[3] "To the extent practicable, potential offerors should be given an opportunity to comment on agency requirements or to recommend application and tailoring of requirements documents and alternative approaches." Another FAR subpart[4] often requires market research before an acquisition.

Requirements-driven processes are well understood as a successful foundation for project planning and execution. Within the context of evolving guidance from OMB[5] and other oversight organizations on how to conduct acquisitions, the role of rigorous requirements definition and tracking becomes critical to a successful acquisition. But perhaps more important are the many benefits of a requirements focus, not the least of which is a satisfactory contractor selection. ❖

Requirements Mandates

Several mandates address requirements in depth and can be useful sources of templates and lists:

- Joint Financial Management Improvement Plan/Federal Financial Management Improvement Act; http://www.whitehouse.gov/omb/financial/ffs_ffmia.html.
- Sarbanes-Oxley (OMB Circular A-123); http://www.whitehouse.gov/omb/circulars/index.html.
- President's Management Agenda; http://www.whitehouse.gov/omb/budintegration/pma_index.html.
- OMB's Lines of Business initiatives; http://www.whitehouse.gov/omb/egov/c-6-9-ioi.html.
- Federal Information Security Management Act and relevant National Institute of Standards and Technology publications; http://csrc.nist.gov/sec-cert/ca-background.html.

References

1. OMB, Memorandum for Chief Acquisition Officers and Senior Procurement Executives, *Increasing the Use of Performance-Based Service Acquisition*, Sept. 7, 2004, pp. 5–7; http://www.acq.osd.mil/dpap/policy/policyvault/2006-1651-DPAP.pdf.
2. Department of Justice, Office of the Inspector General, *The Federal Bureau of Investigation's Management of the Trilogy Information Technology Project*, Audit Report No. 05-07, Feb. 2005, p. 36.
3. FAR, subpart 11.002(c); http://farsite.hill.af.mil/reghtml/regs/far2afmcfars/fardfars/far/11.htm#P10_401.
4. FAR, subpart 10.001; http://acquisition.gov/far/current/html/Subpart%2010_0.html.
5. OMB, Memorandum for Chief Acquisition Officers and Senior Procurement Executives, *Increasing the Use of Performance-Based Service Acquisition*, Sept. 7, 2004, pp. 5–7; http://www.acq.osd.mil/dpap/policy/policyvault/2006-1651-DPAP.pdf.

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