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Why Business Requirements Analysis Leads to Stronger Applications

presented by Alaras Consulting[*]

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Executive Summary

Today's enterprise resource planning (ERP) projects are typically highly complex, and yet development teams for critical enterprise applications continue to use inadequate quality control methods. The result is applications that are so defect-ridden that they are often useless without expensive rework. Many applications require major rework before they are even minimally usable. The business requirements definition stage is particularly susceptible to mistakes. In the typical development project, more than half of these mistakes go undiscovered and become part of the application, leading to costly rework and further productivity losses. Requirements QA analysts specialize in eliminating requirements-based errors. Using sophisticated logical modeling and automated testing techniques, QA analysts can reduce requirements-based defects to zero. This report, presented by Alaras Consulting, describes the requirements analysis process and how it enables stronger, more robust applications, resulting in 1) applications that are much more likely to perform as planned and 2) stronger ROI for every ERP initiative.

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I. Introduction

Today's typical enterprise software application development project is behind schedule, over budget, and so defect ridden that it requires weeks or months of wasteful rework before becoming even minimally functional. The reasons for this problem are complex, but are often largely rooted in the requirements-definition phase. Despite the best efforts of business managers to compile unambiguous business requirements for their in-house or outsourced developers, applications often fail to adequately perform the tasks for which they were conceived.

Organizations have become utterly dependent on information technology. Effective enterprise resource planning (ERP) demands ever more sophisticated and elegant solutions. Hence, organizations have become less able to absorb the productivity and bottom-line impacts of poorly performing software applications. Therefore, effective controls on the development process, especially at the requirements phase, have become increasingly critical.

This report explains how effective requirements quality assurance (QA) can enhance ERP initiatives by eliminating the quality problems, delays, and cost overruns associated with inadequately defined requirements. We will first define the problem of requirements QA, then describe how requirements testing works, followed by a discussion of why adequate requirements QA can alleviate cost overruns and delays. We will then compare problems specific to in-house and outsourced development and identify barriers to effective requirements QA. Finally, we will discuss the advantages of outsourcing requirements QA and how more mature requirements management capabilities can be built into organizations.

II. What Are "Business Requirements"?

The term "business requirements" refers to the formally articulated capabilities that business managers seek to achieve with a specific software application development project. Requirements are created by business managers, then handed off to software developers for execution. Software development is sometimes performed in-house, or, increasingly, outsourced to firms dedicated to this function. Each method has advantages and disadvantages, to be discussed later.

Typically requirements are "written" by a manager or group of managers who work in the department that initiates the development project. Some larger organizations have dedicated requirements staffs that specialize in writing requirements and interacting with in-house or outsourced software developers.

Problems arise when requirements are written in such a way that they fail to communicate adequately the business needs behind the development project. Common problems include:

- ❑ Ambiguously worded requirements
- ❑ Missing steps
- ❑ Contradictory requirements

Faced with these problems, developers often attempt to decipher the requirements they have been given and code them as written. This is especially prevalent with fixed-price, outsourced development. The result is defect-ridden applications that require costly, time-consuming rework just to become minimally functional. In fact, 56 percent of application defects are attributable to faulty requirements.[1] Even if the application can be salvaged, much of the desired functionality is often either absent or poorly performing.

III. Requirements Quality Assurance

A new specialty—business requirements quality assurance—has recently emerged to address the need for accurate requirements, i.e., those that allow developers to build applications that function correctly the first time, without costly rework. Requirements QA allows defective requirements to be corrected before they can become defective software code.

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The key to requirements QA is testing. In requirements testing, Quality Assurance (QA) business analysts translate the requirements into a logical model, then generate test cases from the model to determine whether the logic articulated in the requirements is complete, consistent, clearly phrased, and unambiguous. The test cases generated by the logical model are later used to test whether the actual application performs as desired. These test cases comprise actual business tasks that are to be performed by the application. QA analysts construct only as many test cases as are necessary to cover the full range of tasks that the application is designed to perform.

This is a departure from traditional test case design and execution. Using Requirements Verification and Testing (RVT), twice the functional coverage is typically achieved with half the number of test cases. This relieves the QA team from being forced to choose between comprehensive testing and completing testing on schedule.

When the logical model fails to compile coherent test cases, the QA analysts flag the corresponding requirements for rewriting. This process continues until the model successfully compiles all test cases.

In compiling test cases, the model flags logical inconsistencies and contradictions. QA analysts trained in these skills raise questions to requirements authors and Subject Matter Experts (SME's) to clarify these gaps in requirements. These questions are known as "ambiguities."

Formally managing ambiguities to their resolution effectively provides requirements authors with previously nonexistent feedback, and developers with requirements that are clearer and more complete and concise.

Typically, requirements authors emerge from this process able to create better requirements in less time.

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[1] James Martin, An Information Systems Manifesto

Using a separate group to test requirements has the advantage of establishing an "arm's-length" relationship between those who write the requirements and those who test them. Also, the robust logical modeling procedures used by RVT - QA analysts ensure that every requirement is tested in a controlled, uniform manner.

IV. Requirements Verification and Testing Cuts Costs and Delays

Before requirements QA, business managers typically relied on "intuitive testing" to determine whether their requirements were accurate. With intuitive testing, managers use templates and checklists to determine whether the requirements are accurate. Unfortunately, intuitive testing misses 40-60 percent of requirements-based defects. Without rigorous requirements QA analysis, these defective requirements become coded into the application, leading to costly rework, delays, and lost productivity.

In contrast to error-prone intuitive testing, effective requirements QA analysis identifies 100 percent of requirements-based defects before coding. The resulting applications are far more likely to do what they were designed to do the first time, without rework.

V. In-House vs. Outsourced Development

While most large enterprise firms used to develop their own applications in-house, cost and expertise considerations have made outsourcing much more common. Strong requirements verification and testing results in more successful developments in either case. With in-house development, outside requirements QA analysts can act as neutral third parties, bridging the gap between business and development groups, which often come into conflict over requirements definition. As outside consultants, requirements QA analysts can act as advocates for the application rather than for a particular group.

With in-house development, the business managers and developers often have at least some communication. With outsourced development, a very different dynamic arises. These projects are often based on fixed-price contracts, and so the software vendor has little incentive to increase costs by engaging in dialogue with the client over requirements issues. Moreover, if a failed project leads to litigation, the vendor is in a stronger position if it simply follows the requirements as submitted. Again, independent requirements QA analysts can act as a bridge between client and vendor, in this case concentrating on providing requirements that are fully tested and unambiguously written.

VI. Using A Requirements Verification and Testing QA Consultant

Optimal requirements analysis can often be achieved by using an outside requirements verification and testing QA consultant. An outside consultant can serve as a

neutral third party, helping smooth the flow of information and minimizing turf battles. Also, the robust logical modeling procedures used by requirements QA consultants ensure that every requirement is tested in a controlled, uniform manner. Moreover, very few organizations have so many simultaneous development projects that they can justify a full time requirements QA team, and in any case, a consultant will in most cases have had far more experience with projects in any given functional area.

Using a separate group to test requirements has the added advantage of establishing an "arm's-length" relationship between those who write the requirements and those who test them.

VII. Enhancing the Maturity of Requirements Capabilities In The Organization

One of the goals of any requirements QA initiative should be to enhance the maturity of the organization's capabilities. The need for professional, unbiased outside QA analysts to manage the requirements definition process will never go away, but the organization can benefit by enhancing its own capabilities, ensuring higher quality, lower cost development projects in the future.

In immature organizations, software often gets to market because of "heroism"; the project succeeds because of one individual's heroic efforts. The obvious problem with the heroic approach is that the hero has the power to "kidnap" the organization.

One of the best ways to circumvent the hero dynamic is to build redundancy into every level of project group responsibility. This tactic ensures that the team can perpetuate itself even if key members are lost.

Redundancy has the added benefit of improving morale. Development projects create intense environments, and redundancy relieves some of the stress. If members need to take time off, for example, they can do so without worrying about holding up the project.

VIII. Summary

Organizations are increasingly dependent upon effective ERP to ensure adequate IT resources for a wide array of marketing, financial, and operational functions. Achieving or maintaining a strong competitive position or, increasingly, merely staying in business, requires robust systems and applications. A poorly conceived and executed development project can cripple an organization—financially and operationally—at the precise moment when managers expect to see significant advances in productivity. Hence, instilling best practices in applications development, beginning with the crucial requirements-definition phase, virtually always results in dramatically enhanced ERP and positive ROI for the organization.