

Quality Assurance Model Capturing ERP Implementation Facets through RVRA Services

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Abstract— Success of any ERP project requires the clear understanding of the various implementation facets and careful and appropriate identification of systematic QA activities to provide adequate confidence that when rolled out the system will fulfill requirements for quality and achieve envisaged business value. In this effort, we unleash details of rigorous ERP QA model designed at Ministry of Education, Saudi Arabia that encompasses four facets of ERP implementation: Project Management, Change Management, Solution Management and Services Management. We provide specific details about review, validation/verification, reporting and advisory (RVRA) services that need to be considered in order to prepare the course for successful ERP implementation.

Keywords— ERP, ERP quality management areas, quality assurance model, quality assurance

I. INTRODUCTION

Many ERP implementations failed for various reasons [1][8][9][10][11][15]. Besides this, approximately 75% organizations in US suffer some degree of failure in their ERP implementation [13]. The major reasons for ERP failure are cost overrun, schedule overrun, system performance deficit or failure to achieve the expected benefits [9][13][14]. According to Panorama's year 2010 study, 57% of ERP implementations take longer than expected and 54% of ERP implementations go over budget [9]. This hints to a reason that gravity of the ERP implementation was not considered carefully, consequently appropriate quality assurance activities were not defined considering various facets of ERP implementation.

The Enterprise Resource Planning (ERP) involves a transformative journey from the as-is state to the desired state. Business transformation to the to-be structure is accomplished through the implementation of changes in areas that span vertical and horizontal territories, and on multiple fronts including people, processes and systems. This entails quality assurance (QA) to identify facets of ERP implementation and specify planned and systematic activities to provide adequate confidence that when rolled out the system will fulfill requirements for quality and achieve envisaged business value. Unfortunately, large number of published papers focused on ERP management, implementation, optimization, software, deployment and supply chain management [3][5][16]. However, a solitary effort by Carvalho et. al. [4] presented quality assurance techniques from development

perspective based on workflows for open source ERP5 system.

In this paper, we describe facets of ERP implementation identified by the QA project to ensure the success of ERP project launched by the Ministry of Education (MOE), Saudi Arabia. We provide specific details regarding what actually needs to be done to ensure that any particular facet is accomplished as originally envisioned. We also shed light on the resulting QA model that evolved. This QA model can help organizations that are planning to implement ERP system to better understand the facets of ERP implementation and hence achieve better control of the ERP project implementation.

The rest of the paper is organized as follows: Section II provides a background of the Government Resource Planning (GRP) system launched by the Ministry of Education (MOE), Saudi Arabia. Section III provides details of the facets of the ERP implementation and the corresponding QA activities that need to be performed. The resulting QA model is described in Section IV. We conclude and provide hints on the future work in Section V.

II. PROJECT BACKGROUND

The Ministry of Education (MOE), Saudi Arabia, has launched an initiative to implement a ministry-wide resource planning system to manage, integrate and use all the resources and information in the Ministry and its associated regional departments. This will provide communication channels between MOE's various departments on all levels and in all provinces which will cover 500,000 employees of the ministry. This is a key eGovernment project with the goal of automating the Ministry's operations and building the capability to deliver electronic services.

After considering the extent of the project with the goals to improve the outcome and help to accomplish its successful completion, the ministry has launched a separate Quality Assurance (QA) project. The project is carried out by a CMMI level-5 multinational organization. The overall objective is to provide a framework that supports the quickest possible ERP deployment, without sacrificing quality or functionality within allocated budget. That is, the successful implementation of the ERP systems in terms of:

- Functionality
- Quality of Service
- Schedule

- Cost
- Training
- Deployment
- Operation Readiness
- Post-implementation

III. FACETS OF ERP IMPLEMENTATION THAT REQUIRE QUALITY ASSURANCE

The QA project identified four facets of ERP implementation that require quality assurance to ensure the successful completion of ERP project in terms of aforementioned goals. These four facets require QA to provide review, validation/verification, reporting and advisory (RVRA) services, see Figure 1. These are:

- Project management
- Change management
- Solution management
- Services management

The concept of providing advisory by the QA to the Implementer and the project management (PM) team is unique to this project. In general, the QA activities, e.g., described in [1][12], for any project irrespective of the domain resort to only providing review, validation/verification and reporting services and leave it on to the Implementer and/or the PM team to make critical decision for improving quality based on the feedback provided by QA. Since QA team comprises experienced and skilled personnel and they look at the ERP implementation from different perspective (QA perspective) therefore we believe it would be beneficial to seek advisory services from the QA. This enables QA team to provide useful advice(s) and solution, whenever deemed necessary, to the Implementer and the PM team in order to improve quality of the intended ERP system.



Figure 1. ERP Facets with QA RVRA Coverage

A. Project Management

The various components of project management that need QA RVRA are discussed in the following sub-sections.

1) Program Management: The goal of the program management RVRA is to provide effective monitoring and controlling, using appropriate tools and techniques based on the standard(s) followed, of the ERP implementation program and report on the overall program status on a regular basis throughout the duration of the project. The purpose of

monitoring and controlling is to ensure that the project is progressing as per the schedule, and is delivering the required products while satisfying the acceptance criteria. In addition, control ascertains if the project remains aligned with the business case direction and enables course correction if deviations are found. More specifically, the program management stream requires RVRA services for the following functions: ERP planning assessment, ERP monitoring and control, project management advisory, issue pollution control and digressions identification.

2) Staff Assessment: Staff assessment supports the Implementer and the PM team in interviewing and qualifying key resources assigned to the project by the Implementer.

3) Risk Management: The RVRA activities that can be performed for risk management are:

- Review, evaluate and advise on risk assessment and mitigation plans submitted by the Implementer.
- Review, evaluate and report on ongoing risk management performed by the Implementer. Review risks on a periodic basis.
- Raise risks against the project when necessary.

4) Status Reporting: This is required to:

- Report performance of the program on predefined basis.
- Deliver project status presentation to the PM team.
- Raise a summary report in circumstances which have caused or may cause a negative impact on the project, its design, development, implementation, cost, or time for completion.

B. Change Management

The ERP project involves a transformative journey from the as-is state to the desired state. Business transformation to the to-be structure is accomplished through the implementation of changes in areas that span vertical and horizontal territories, and on multiple fronts including people, processes and systems. The size of the transformation can be gauged by the effort involved in bringing about the desired transformation, while the risk associated with the change can be assessed by considering the level of stakeholder expectations. The transformation work is primarily comprised of building the systems and the processes that will enable the new ways of business, but the tasks needed to prepare the people for the change ahead is also important. The activities that are required to be undertaken by the Change Management (CM) QA RVRA are:

- Review CM strategy developed by the PM team, check alignment with business strategy and advise improvements where applicable.
- Contribute to the development of the change management plan.
- Assist the PM team in identification and appointment of change leaders.
- Review the Training Needs Assessment exercise and provide recommendations where applicable.

- e) Review change communications and awareness campaigns plans, check for alignment with the change management strategy and report findings.
- f) Review the feedback received as a result of change communication and present findings to the PM team.
- g) Ensure incorporation of the feedback that is accepted by the PM team in relevant plans and processes.
- h) Review and validate training plans and knowledge transfer plans, report findings and provide recommendations for improvements.
- i) Co-ordinate with relevant teams to prepare deployment and operations readiness plans.
- j) Evaluate the execution of change management plan and recommend improvements when necessary.

C. Solution Management

The various areas of solution management that are considered under QA RVRA are:

1) Solution Design: The Solution Design scope covers the following:

- a) Review the application specifications and design documents.
- b) Validate the Implementer's proposed solution against requirements and provide recommendations.
- c) Validate and review the solution architecture.
- d) Validate and review the design and implementation of security profiles.
- e) Validate the functional setup of the proposed solution in different environments.
- f) Ensure that the user requirements are reflected accurately in the specifications and design documents.

2) Application Customization: The Application Customization scope covers the following:

- a) Review application extension design and solution.
- b) Validate any customization against the clarity of code, the fulfillment of the requirements, and the usage of the recommended application APIs, database packages, and applications packages.
- c) Review the proposed and implemented interface solution, and provide better solution in case of any glitches.
- d) Functional test and validation against any customization, interface, or application extension.

3) System Test: The System Test scope covers the following:

- a) Review test plans developed by the Implementer to ensure conformance with the business requirements, quality policies, procedures, and standards. Because of their critical nature, special attention must be given to the system integration, performance, security and user acceptance plans.
- b) Review the outcome of system tests conducted by the Implementer and report exceptions and trends.
- c) Perform comprehensive tests against application functional set up and security setup.

4) Data Migration: The data migration scope covers the following:

- a) Review and validate data conversion strategy, standards and programs.
- b) Validate the completion of data migration and full data load.

D. Services Management

Services management ensures readiness for the roll-out of the ERP System, smooth Go Live and an assessment of post Go live operations.

1) Pre Go-live Health Check: This is an important QA activity meant to ascertain full readiness of the target to-be system or module for "production" operations. This assessment is a 360-degree audit to check if the associated environment and products are ready and that processes and people are in place to manage, operate and maintain the new system. The pre go-live review requires QA to perform health check for each implemented module in the ERP scope, conduct an independent validation of the Implementer's assessment of the "to-be" deployed solution and recommend a "Go/No-Go" decision. The review considers aspects of:

- i. Site readiness.
- ii. IT infrastructure readiness
- iii. Data readiness
- iv. User accounts and security rights
- v. End-user training and user support structure.
- vi. Fall back options in the event of unforeseen system issues.

2) Post Implementation Assessment: The post-implementation health check covers three categories: Health, Availability and Usage monitoring. Health monitoring covers those parameters that indicate the quality of service, while Availability monitoring provides information on the availability of resources. Together they provide an efficient mechanism to determine the performance of the system. Usage monitoring helps in the analysis of the ERP system from a utilization perspective.

IV. QUALITY ASSURANCE MODEL

The identification of aforementioned ERP implementation facets and corresponding QA RVRA activities require that a QA model be defined considering ERP life cycle (e.g., ORACLE Application Implementation Methodology phases [7]) so that four facets of ERP implementation are covered under QA RVRA. We have therefore designed a robust QA model [17], refer to Figure 2. The QA model depicts that a Quality Environment be defined that comprises all those planned and systematic actions necessary to provide adequate confidence that the solution rolled out satisfies all the ERP implementation facets under QA RVRA. The QA environment for the ERP implementation has the following characteristics:

- a) Segregation of implementation and QA roles and responsibilities.
- b) Appropriate level of authority for the QA role.

- c) Escalation of quality issues to PM and Implementer management until they are resolved.
- d) Project standards and procedures for each area of the project to ensure consistent delivery in accordance with the quality requirements.
- e) Management reviews and audits for early detection of issues.
- f) Formal reviews of deliverables, monitoring and execution of corrective actions.
- g) Adequate systematic testing activities addressing functional and non-functional aspects.
- h) Records management.
- i) Effective measurement and corresponding techniques to identify the level of quality and productivity being achieved based on the identified quality goals, and to provide a baseline for continuous improvement.
- j) Orientation about quality management to PM and Implementer teams.

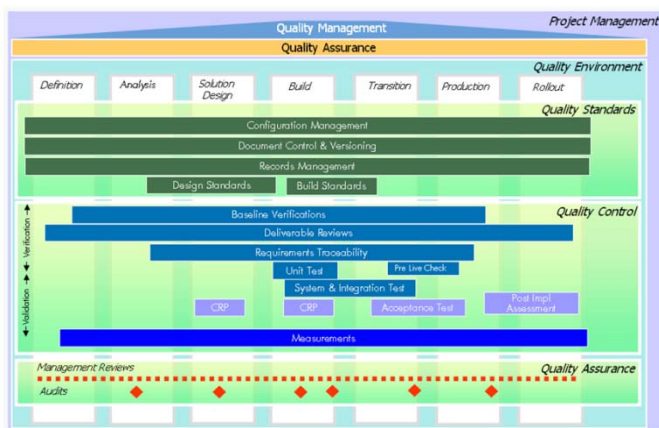


Figure 2. Quality Assurance Model [17]

A recent report published by Gartner Research revealed that organizations usually measure the effectiveness of ERP implementation and development in terms of time and budget than other factors such as quality of process, quality of product, stability of requirements etc. [6]. The result is that although organizations meet deadlines and budgetary requirements but lose what they intended to achieve that can satisfy all business requirements originally envisaged before launching the project. In other words, organizations usually put less focus on quality goals of ERP implementation and consequently this leads to the failure of the ERP system because such system simply fails to achieve envisioned business value. Therefore, we deem it necessary to augment here that while designing measurement plan, as depicted in the QA model, the QA team must identify quality goals and the corresponding appropriate metric suite to ensure that when rolled out the ERP system will provide the envisaged business value. We have designed one such measurement plan to suit our environment and that can be refined for other implementation and business environments, but details are being provided in a different paper due to limited space here.

V. CONCLUSION AND FUTURE WORK

The widespread coverage of ERP implementation entails the QA to identify facets of ERP implementation and specify planned and systematic activities to provide adequate confidence that when rolled out the system will fulfill requirements for quality and achieve envisaged business value. Such QA activities packaged together with ERP implementation phases with a clear understanding of when such activities need to be carried out through a QA model are needed for the success of any ERP implementation. This led the QA team at MOE Saudi Arabia design a robust QA model, mentioned in Section IV, which captures aforementioned attributes. This QA model is operational and being validated. The authors expect to report on the findings and the validation results once the project's implementation phase is over and rolled out for operation. Moreover, the interested organization(s) can get a head start with this model and design their own QA model based on their implementation environment and quality requirements.

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