FEATURE Project Management

# Redefining Health IT Project Success

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## ABSTRACT

Most industries deem a project successful if it ends within agreed-upon scope, schedule and cost objectives with required features. However, in the healthcare industry, health IT success only *begins* after the project ends. Today's focus on increasing and improving health IT to help resolve the myriad causes of the healthcare crisis puts more pressure on health IT project managers to deliver success. We need not only a better definition of success, we need to identify a better set of tools to get there. One potential toolset is an integrated methodology of project management, IT management and change management.[1]

In a pilot study to assess the potential value of this methodology, we interviewed nationally recognized healthcare project CIOs and directors to identify what aspects of these three models significantly contribute to the success or failure of their health IT projects. The findings from the study suggest that successful projects shared many common elements. Likewise, failed projects often had similar flaws or missteps. In aggregate, we identified key areas from each management model that contribute to project success, and offer suggestions on how to include these to improve the success of future health IT projects.

## KEYWORDS

Health information technology, health IT, projects, project management, information technology, change management, project success, healthcare systems.

THERE IS NO QUESTION that resources expended to implement health IT increased dramatically in the past five years, in part due to the 2009 American Recovery and Reinvestment Act (ARRA) and the 2010 Patient Protection and Affordable Care Act (ACA).

Healthcare delivery organizations shifted from a cautious approach to joining what some consider the health IT gold rush.[2] Spending on clinical health IT may reach nearly $17.5 billion by 2016.[3] There is more than $20 billion in ARRA stimulus spending, and potentially significantly more in coming years as reforms like accountable care organizations and health information exchange (HIE) move from pilots to full-scale. Moreover, many believe health IT plays a central role in alleviating several, if not most ills, facing healthcare today, including less than acceptable quality levels and higher than acceptable patient safety risk levels.

In short, widespread opinion is that health IT is the key to healthcare transformation. This is welcome news if IT is simple to implement and straightforward to use—however, this is rarely the case.

The Standish Group regularly reports on IT project management success across industries. Their 2009 CHAOS report notes only "...32% of all projects succeeding which are delivered on time, on budget, with required features and functions... 44% were challenged which are late, over budget, and/or with less than the required features and functions and 24% failed which

are cancelled prior to completion or delivered and never used."[4]

Health IT projects are not immune to these conditions. While prior studies on health IT success and failure show widely variable outcomes, a common theme is 70 percent of the systems either fail or do not provide end-user satisfaction.[5] Both clinical and administrative health IT systems have similar failure rates. If these numbers are accurate—or even close—it is clear we need to better understand the underlying causes and find effective solutions.

It is worth discussing what *failure* means. At the broadest level and using a project management perspective, failure can mean the project does not meet expected scope, schedule or cost objectives. Stated succinctly, we could define failure as projects that do not deliver, as they should, are over budget or are late.[6] However, health IT failure is defined, there is abundant evidence that its causes are myriad and include the complexity of healthcare delivery structures, organizational change resistance, relative technology immaturity, rapid systems acquisition and implementation, a highly regulated industry, strong and divergent professional cultures, thin operating margins, to name but a few. Solutions for each problem are likewise diverse in number and type, but generally all boil down to the idea that projects suffer due to incomplete or inadequate management—from high-level strategic leadership through frontline operations management.

Ultimately, health IT project success simply makes information available. Healthcare organization success is making beneficial use of that available information. Health IT projects offer only a means, not an end. For example, a successful health IT project may *deliver* data collection tools that can benefit patients. However, to realize those patient benefits, healthcare professionals must actually *use* that data.

The Project Management Institute (PMI) defines a project as "a temporary endeavor undertaken to create a unique product or service. Temporary means that every project has a definite beginning and a definite end. Unique means that the product or service is different in some distinguishing way from all similar products or services."[7] Projects are different in this way from *regular work* organizations execute, so it follows there are different management approaches to project vs. regular work. A range of models developed over the years formalizes and structures such efforts.

For example, PMI created and refined the *Project Management Body of Knowledge* (PMBOK®). Another model is the Institute of Electrical and Electronic Engineers (IEEE) *Software Engineering Body of Knowledge* (SWEBOK) that focuses on system implementation best practices. While each model has a body of evidence suggesting its use can increase success likelihood, we propose a combination of models may prove synergistic. We proposed one such model,[1] called Integrated Project Management, that combines aspects of PMBOK®, SWEBOK and a new model of change management we created, since no well-established nor broadly accepted change management model exists.* This paper highlights our pilot study findings on the effectiveness of Integrated Project Management on health IT project success.

**We derive from instead of adhere to PMBOK® Guide and SWEBOK standards. For example, the PMBOK® Guide outlines requirements definition as the first step in scope management. We address requirements management as a completely separate part of IT management, instead of embedding it in project scope management. While this violates standards compliance, it resolves critical requirements management issues that increase the likelihood of project success.*

## BACKGROUND

The Integrated Project Management model combines similar and related aspects of project management, IT management and change management models. The concepts, activities and documents undertaken and created in each model are often parallel—and sometimes identical—to those in other models. Therefore, combining them into a simplified and integrated model may provide synergistic effects. If so, optimally planning and executing health IT projects effectively require all three models adopted in concert.

The three existing models included in Integrated Project Management have a similar structure. They each have between five to 10 knowledge areas—specific sub-models defining an expertise domain that collectively define all the critical aspects of successful project management. For example, in PMBOK®, there are nine defined knowledge areas, including four core knowledge areas (scope management, time management, cost management and quality management), four supporting knowledge areas (human resource management, communications management, risk management and procurement management) and one overarching knowledge area, integration management.

The IT management methodology in SWEBOK is distinctly similar to the PMBOK® Guide in terms of structure. It includes 10 IT management areas covering user requirements, infrastructure, conversion, software configuration, workflow, security, interface, test, cutover and support. Our change management model includes five knowledge areas: realization management (what stakeholders do to achieve project objectives), sponsorship management (selecting, assessing and mentoring the project's most senior leader), transformation management (how individual stakeholders or groups adopt innovation), training management (educating users to take advantage of workflow and system benefits) and optimization management (conducting ongoing innovation after cutover to operations).

At the core of each model's knowledge areas are processes producing required outputs. For example, in the project management knowledge area of scope management one output a project team creates is a project charter, the document launching the project with steering committee approval and project manager engagement. Table 1 identifies the 90 outputs from all 24 knowledge areas.

Because all projects occur over time, it is useful to divide a project into temporal phases. The five-phase model from PMBOK® is useful here. These phases are process groups, including project initiating, planning, executing, monitoring and controlling and closing. These phases overlap and are not temporally distinct.

In this study, our primary objective was preliminarily testing the hypothesis that an integrated methodological model of project

**TABLE 1: Integrated Project Management Outputs**

**Project Management**

- Feasibility study and business case
- Project charter
- Project management plan
- Scope statement
- Work Breakdown Structure (WBS)
- WBS dictionary
- Schedule
- Cost estimate
- Budget
- Quality management plan
- Human resources plan
- Resource assignments
- Project roster
- Communications plan
- Risk management plan
- Risk register
- Risk response plan
- Procurement plan
- Vendor solicitation
- Performance reporting
- Deliverables
- Project team performance assessment
- Vendor selection
- Change Request (CR)
- Project document updates
- Organizational process asset updates
- Deliverable Completion Certificates (DCC)
- Phase and/or project closeout
- Final acceptance

**IT Management**

- High-level user requirements
- High-level technology requirements
- Existing technology architecture diagram
- Requirements management plan
- Infrastructure management plan
- Facility management plan
- System installation plan
- Security plan
- Conversion plan
- Interface management plan
- Software configuration management plan
- Workflow management plan
- Test plan
- Cutover plan
- Support plan
- Detailed user requirements
- Detailed technology requirements
- Equipment order confirmation
- Site readiness confirmation
- Hardware readiness confirmation
- Software readiness confirmation
- Security requirements
- Security roles
- Data conversion map
- Data conversion confirmation
- Conversion solution confirmation
- Conversion confirmation
- Interface data map
- Interface solution confirmation
- Interface confirmation
- Configuration requirements
- Workflow requirements
- Workflow changes
- Test cases
- Test data
- Tester training completion confirmation
- Test results
- Regression tests
- Cutover training completion confirmation
- Successful cutover confirmation
- Support requirements
- Support roles and responsibilities matrix
- Support team training completion confirmation
- Ongoing security compliance audits
- Hand-off to ongoing support

**Change Management**

- Objectives
- Executive sponsor
- Measurable outcomes
- Outcome delivery schedule
- Objectives responsibility list
- Executive sponsor assessment
- Change management team
- Stakeholder map
- Training needs assessment
- Training plan
- Optimization management plan
- Transformation tasks
- Transformation task completion
- Training documentation
- Training completion confirmation
- Ongoing optimization requirements

management, IT management and change management has promise in improving overall health IT project success vs. using any one of the individual models alone.

## METHODS

The primary activity of this pilot study was considering each of the 90 outputs defined in our model to discover whether successful and failed projects included each output, and if included, how each output's quality and inclusion affected the project outcome.

To test the concept, we used an exploratory survey design. We recruited a convenience sample of six senior members from IT departments in six healthcare organizations across the country (Boston, Seattle and Los Angeles). These were either CIOs or directors of their organizations with between 12 and 30 years of experience leading and managing a range of clinical and administrative health IT projects. Four organizations were generally mid-sized to large hospitals (between 250 and 820 beds), one an integrated ambulatory delivery system and one a public sector healthcare provider.

The study design was a semi-structured guided interview using a web-based survey instrument. The survey-driven interview prompted each informant to first identify two health IT projects completed within the last seven years for which he or she held a leadership role. We asked them to identify one project they considered a success and one a failure. We did not prescribe specific definitions of success and failure in advance—each informant was free to define these using their expertise and experience. Between July and September 2011, we conducted approximately two-hour interviews with each respondent.

After defining individual projects as successes or failures, we ask each informant a series of linked questions for their project. The initial question was whether their project included each of the 90 integrated project management outputs listed in Table 1.

For example, did the project include a project charter (project management), a requirements management plan (IT management) or an executive sponsor assessment (change management)? For each included output, we asked the informant to rate its quality using a six-level Likert scale ranging from unacceptable to excellent. We then asked the informant to identify whether including the output and its quality were factors in the project outcome, rated on a six-point Likert scale from strongly disagree to agree. For outputs not included, we asked whether non-inclusion was a factor in project success or failure.

Three individuals independently analyzed the data. We analyzed all 90 outputs in various classifications, with the main comparison focusing on successful and failed projects. To simplify the results for quality and impact we summed it dichotomously. We defined quality as either high (excellent, very good or good on the Likert scale) or low (poor, very poor or unacceptable on the Lik-

ert scale). We defined impact as a strong (strongly agree, agree or somewhat agree) or weak (somewhat disagree, disagree or strongly disagree). We organized the results by process group (initiating, planning, executing, monitoring and controlling, and closing) and by model in the integrated methodology (project management, IT management and change management.)

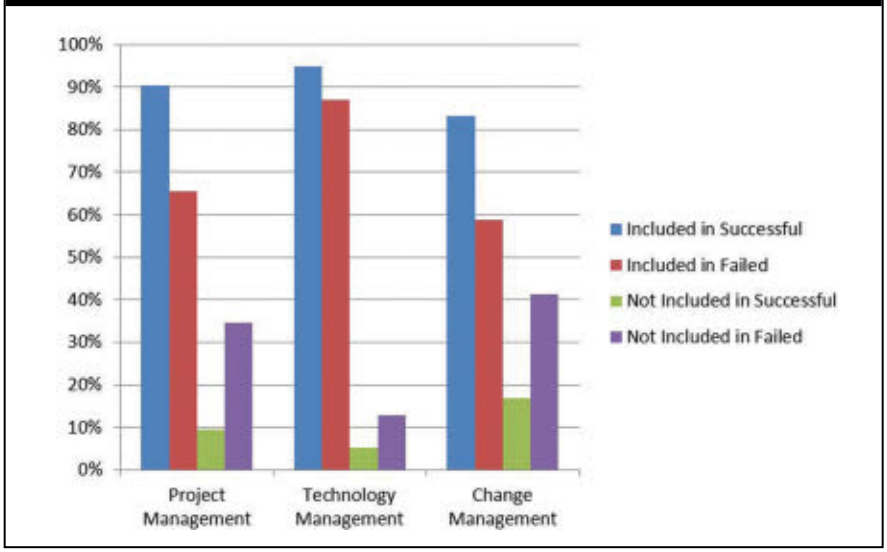
## RESULTS

Our six informants described eleven projects, six successful and five failed. The projects covered a range of health IT systems, such as implementation of a picture archiving and communication system (PACS) or physician mobile devices.

**Hypothesis 1: More Project Outputs Increase Project Success**

Successful projects included considerably more outputs than failed projects (89 percent vs. 71 percent). When broken down into the three models, the effects seem similar. Successful projects included 90 percent of project management outputs, 95 percent of IT management outputs and 83 percent of change management outputs, as depicted in Figure 1. Conversely, for failed projects these rates were 65 percent, 87 percent and 59 percent, respectively. The largest differential between successful and failed projects was in the project and change management models. Similar findings appeared when categorizing outputs by process group, as depicted in Figure 2. The process groups with the largest differential were initiation and planning.

**FIGURE 1: Impact of Inclusion on Project Outcome, by Management Model**



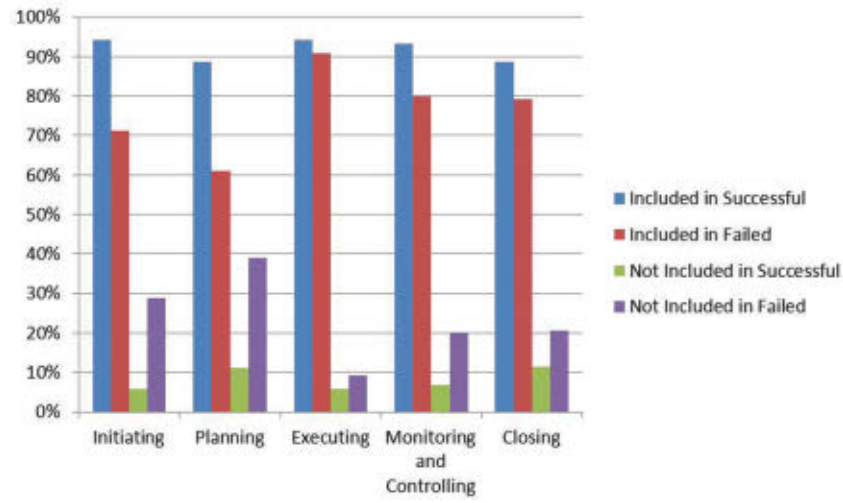

**Hypothesis 2: Higher Quality Outputs Increase Project Success**

For specific included outputs, the assessed output quality also appears to increase project success, as depicted in Figure 3. Successful projects had high quality outputs in 96 percent of project management, 95 percent of IT management and 95 percent of change management. Failed projects had much lower quality outputs ranging between 63 percent for project management, 60 percent for IT management and 54 percent for change management. We likewise found a similar pattern for each process group (Figure 4) with 93 percent to 100 percent high-quality outputs from all process groups present in successful projects. Failed projects had high-quality outputs between a low of 57 percent in executing and a high of 74 percent in closing.

In short, successful projects included 38 percent more project management outputs, 32 percent more IT management outputs and 42 percent more change management outputs than did failed projects (Figure 1). For all models, output quality averaged 30 percent higher for successful projects than for failed projects (Figure 3). Change management outputs showed the highest quality disparity between success and failure (95 percent high-quality for success vs. only 54 percent high quality for failure).

**Hypothesis 3: Integrating Outputs from the Three Models Increases Project Success**

**FIGURE 2: Impact of Inclusion on Project Outcome, by Process Group**



## PROCESS GROUPS

Within the five process groups, including more outputs from all three models during early formative project phases (initiating and planning) notably increases project success. For example, initiating includes project charter (project management), high-level user requirements (IT management) and objectives definition (change management). Likewise, planning includes the project management plan, which consolidates plans from all three models.

Similarly, high output quality in initiating and planning process groups favorably affects project success. These findings are logically consistent because strong execution and control of a poorly conceived and designed project is insufficient. In short, projects that start well tend to end well.

While included in both successful and failed projects, closing process group high quality outputs increase project success. For example, the transition between the project team and operations (e.g., hand-off to ongoing support [IT management]), was good to excellent for 100 percent of successful projects vs. 67 percent for failed projects. Other activities initiated at the project end (e.g., ongoing security compliance audit [IT management] and ongoing optimization [change management]), were 100 percent and 83 percent good to excellent for successful projects, while only 67 percent and 50 percent good to excellent, respectively, for failed projects.

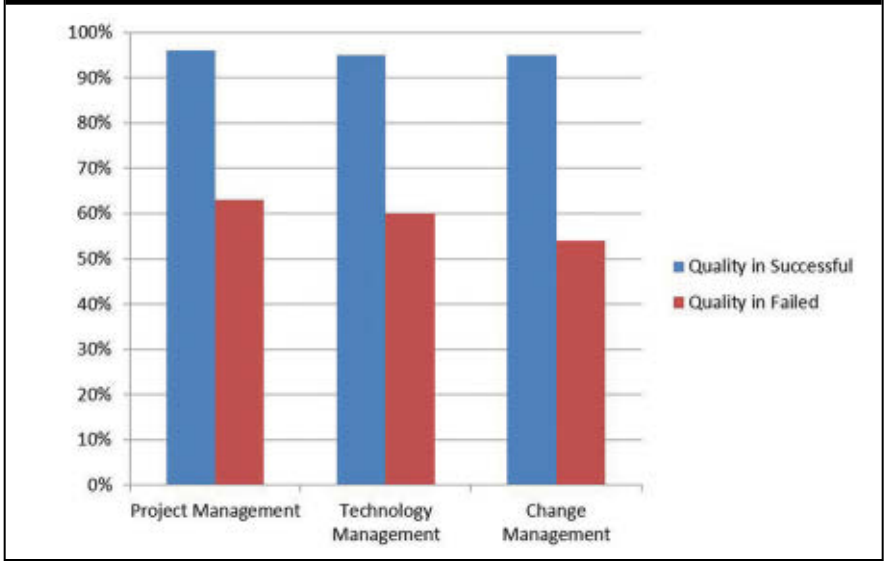
## KNOWLEDGE AREAS

Successful projects relied on a greater percentage of high quality outputs from all three models versus failed projects. Failed projects included 60 percent fewer scope management outputs, 80 percent fewer quality management outputs and 85 percent less risk management outputs. Successful projects included 61 percent more transformation management outputs vs. failed projects.

Of the project management quadruple constraint (*i.e.*, scope, schedule, budget and quality), excluding scope management and quality management outputs is more likely to result in project failure. However, the quality of all four increases project success.

## OUTPUTS

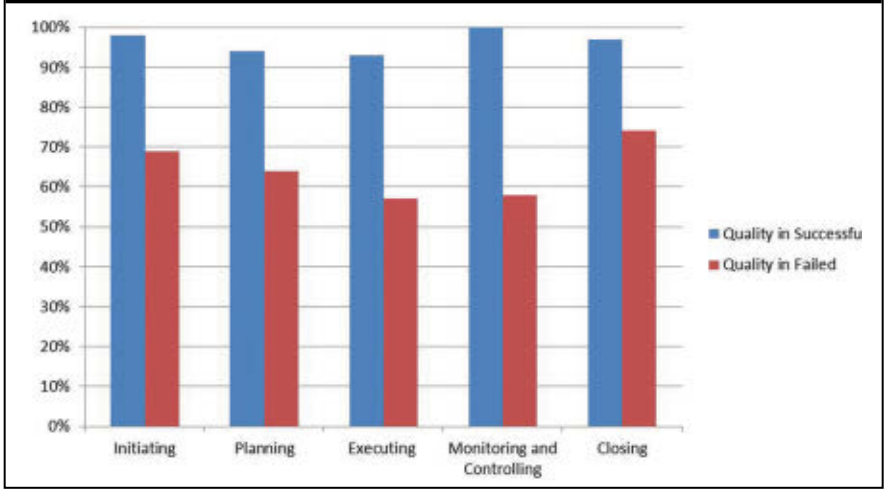
**FIGURE 3: Impact of Quality on Project Outcome, by Management Model**




The data suggests some specific outputs are more important. This is a crucial consideration for our model's validity since some outputs, by their nature, include aspects from all three models and therefore may increase project success or failure. For example, both successful and failed projects included a high quality feasibility study/business case. The feasibility study/business case output includes other outputs across all three models—high-level user and technology requirements, objectives, measurable outcomes and a scope statement. The quality of these component outputs averages 30 percent less for failed projects than for successful ones. Better objectives, measurable outcomes and scope statements appear significant contributors to project success.

Successful projects all include a good or better project management plan, while all failed projects included plans of fair or worse quality. Component outputs in a proj-

**FIGURE 4: Impact of Quality on Project Outcome, by Process Group**



ect management plan, are a cross-section from all three models (e.g., the schedule, quality management plan, risk management plan, risk response plan from project management; requirements management plan, system installation plan, conversion plan and cutover plan from IT management); and the stakeholder map, training plan and optimization plan from change management. When of fair or worse quality, these outputs contributed significantly to project failure.

Like the feasibility study/business case and project management plan, project status reports and quality management reporting include a cross-section of knowledge areas and outputs from all three models. Not surprisingly, as with these other two integrating outputs, higher quality increases the likelihood of success. For example, successful projects indicated 100 percent of status reporting was good to excellent vs. only 20 percent for failed projects. With quality management reporting, the quality of change requests, organizational management and document updates was significant, with successful projects indicating 100 percent good to excellent for all three outputs and failed projects indicating 75 percent, 50 percent and 50 percent, respectively.

Examining outputs by individual model also proved instructive regarding project success or failure. For example, all 29 project management outputs were high quality in successful projects, vs. 18 of 29, or 62 percent, for failed projects. Separately, successful projects included 17 of 29, or 58 percent, of project management outputs vs. eight of 29, or 27 percent, present in all failed projects.

In IT management, both successful and failed projects tended to include a somewhat similar number of IT outputs. For example, 32 of 45, or 71 percent, of IT outputs were in all successful projects vs. 28 of 45, or 62 percent, present in all failed projects. Once again, however, the quality of these outputs for successful projects is significantly higher than for failed projects. For example, for successful projects, 44 of 45, or 98 percent, of included IT management outputs were high quality vs. 24 of 45, or 53 percent, for failed projects.

Finally, successful projects included seven of 16, or 43 percent, of change management outputs vs. two of 16, or 13 percent, present in all failed projects. All 16 change management outputs were high quality in successful projects vs. 10 of 16, or 63 percent, for failed projects. Including an executive sponsor, measurable outcomes and ongoing optimization planning were critical to project success.

## COMMENTS

Including high quality outputs from project management, IT management and change management models increases project success. By contrast, neglecting to include several key initiating outputs (e.g., feasibility study/business case, project charter, executive sponsor selection) contributes significantly to project failure. The feasibility study/business case is an integrating output that includes component outputs from the other two models (e.g., high-level requirements, measurable outcomes). This reaffirms that relying on integrated project management, IT management and change management models helps increase project success.

This study has limitations. As a pilot study, the convenience sample is small and covers only a limited range of project and healthcare organization types. The data represent opinions of senior health IT leaders, and as such, reflects the opinions of people somewhat removed from day-to-day project aspects, as well as day-to-day ongoing system use. Our study design only allows for an appearance of correlation between output inclusion, quality and impact—we cannot assess causation. However, the data from this investigation provides sufficient evidence that our integration model hypothesis—project management, IT management and change management—has promise in improving overall health IT project success. As a result, we recommend further study of this hypothesis to determine causal relationships that may help increase future HIT project success, e.g., proving that integrated outputs like the project management plan cause project success.

Healthcare delivery organizations are unquestionably on a one-way road toward universally adopting health IT. A traditional IT project management perspective typically defines success as meeting project scope, schedule and cost objectives with required features. We believe health IT projects must achieve additional objectives – namely they must contribute to reducing healthcare costs, raising healthcare quality and decreasing patient risks. A primary focus on scope, schedule and cost objectives and required features will not help us achieve these objectives—hence, the need for new models that enable success after the project ends.

Health IT projects cause transformational changes, and as with all transformational change, the road is rocky. Evidence to date clearly indicates this is a costly transformation in dollars, human resources and organizational capital. What we learn from past missteps and triumphs helps create new models that may significantly smooth the road ahead. Improving health IT project success rates is an important step in this process that we hope will make patient care more effective and the expenditures worthwhile. **JHIM**

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