

A Framework for governance of Post-Construction activities In IS development Projects (Case study in Egyptian environment)

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Abstract

Some of IS development projects have a bad reputation for going over budget and schedule, not realizing expectations and so providing poor return on investment.

This research is designed to identify the main causes for IS development project failure at Post-construction phase, the technical and final post-construction activity, and applying it to the Framework for Governance of Post-Construction activities in IS development Projects in Egypt.

Interviews with Project Managers and stakeholders during deployment phase were conducted. Data gathered from interviews were analyzed and corroborated with previous surveys and case studies on IS development projects failure and projects success at implementation phase.

A framework are developed and tested for governance of successful IS development projects implementation, by governance of Post-Construction activities in IS development Projects.

Keywords:

IS, Development project, Implementation, Success, failures, Governance, Critical Success Factors, Egypt.

1. Introduction

Many published studies indicate that the cost of IS projects failure is at least 30 to 80 billion dollar range annually, many IS projects have difficulties to be completed on right time, on right budget and on the right scope, these Studies did not provide a way for governance of the Post-Construction activities in IS Projects to avoid their failure [1],[2],[3],[4],[5], [6].

Data collection is done through an extensive literary review and many other interviews with IS managers in some of Egyptian enterprises adopting Software development and having previous experience in managing IS development projects.

Our aim in this work is to Studying the detailed tasks included in each activity of final post construction phase (according to international standards), what are the causes of IS development projects failure, what is the most important ways to avoid IS development projects failure and what are the Critical factors toward achieving a successful IS development projects implementation.

2- Background & literature review

IS development projects fail when they do not meet the criteria for success. Most of the IS development projects run over budget or are terminated prematurely and those that reach completion often fall far short of meeting user expectations and business performance goals [7].

Standish Group [8] classify IS development projects to three category, Successful projects were completed on time and on budget, with all the features and functions that initially specified, Failed projects were cancelled before completion or never implemented and Challenged projects were completed and operational, but over-budget, over the time estimate, and with fewer features. Standish Group [8],[9] determine the IS development projects success factors, the IS project challenged factors and the IS failed d projects factors as follows:

Project Success Factors	% of Responses
1. User Involvement	15.9%
2. Executive Management Support	13.9%
3. Clear Statement of Requirements	13.0%
4. Proper Planning	9.6%
5. Realistic Expectations	8.2%
6. Smaller Project Milestones	7.7%
7. Competent Staff	7.2%
8. Ownership	5.3%
9. Clear Vision & Objectives	2.9%

10. Hard-Working, Focused Staff	2.4%
11. Other	13.9%

Table [1] Project Success Factor

Project Challenged Factors	% of Responses
1. Lack of User Input	12.8%
2. Incomplete Requirements & Specifications	12.3%
3. Changing Requirements & Specifications	11.8%
4. Lack of Executive Support	7.5%
5. Technology Incompetence	7.0%
6. Lack of Resources	6.4%
7. Unrealistic Expectations	5.9%
8. Unclear Objectives	5.3%
9. Unrealistic Time Frames	4.3%
10. New Technology	3.7%
11. Other	23.0%

Table [3] Project Impaired Factors

Project failed Factors	% of Responses
1. Incomplete Requirements	13.1
2. Lack of User Involvement	12.3
3. Lack of Resources	10.6
4. Unrealistic Expectations	9.9
5. Lack of Executive Support	9.3
6. Changing Requirements & Specifications	8.7
7. Lack of Planning	8.1
8. Didn't Need It Any Longer	7.5
9. Lack of IT Management	6.2
10. Technology Illiteracy	3.3
11. Other	9.9

Table [2] Project Challenged Factors

3- IS post-construction activities:

According to dividing the IS post-construction activities into two categories:

- IS projects Deployment activity

- IS projects closing activity

IS projects Deployment activity includes the following tasks:

1. Security policy activity
2. Installation Activity
3. Integration activity
4. Testing activity
5. Implementation activity
6. Documentation activity

IS projects closing activity includes the following tasks:

1. Contract management activity (Post-construction tasks)
2. Risk Management activity
3. Training and Support activity
4. Delivery Activity
5. Maintenance activity
6. Disposition activity

All of the post-construction activities and the Critical Success implementation factors belong to these activities discussed in details at our previously published paper [10] "Governance of Post-Construction activities in IS Development Projects".

4. Common causes of IS development projects failure:

Table [4] shows the common causes of IS development projects failure [9].

Common causes of IS development projects failure	% of Responses
Incomplete requirements	13.1
Lack of user involvement	12.3
Lack of resources	10.6
Unrealistic expectations	9.9
Lack of executive support	9.3
Changing requirements and specifications	8.7
Lack of planning	8.1
Didn't need it any longer	7.5
Lack of IT management	6.2
Technology illiteracy	3.3
Other	9.9

Table [4]: Some of the results of The Standish Group survey, The CHAOS report [9].

5. IS development Projects Failure Reasons at post construction activity:

IT Project fails when it does not meet one or more of the following criteria for success [11].

- It is delivered on time
- It is on or under budget
- It satisfies user requirements

Only a few projects achieve all three. So what are the key factors for IS development projects implementation failure? Organizations and individuals have studied a number of projects that have both succeeded and failed and some common factors emerged. A number of these

factors are involved in any particular project failure and they are interacting with each other. Here are some of the most important reasons for failure [12] [**Error! Reference source not found.**13**Error! Reference source not found.**].

5.1 Lack of Project Methodology:

Project Methodology or project lifecycle describes the approach that will be taken to carry out a project. Lack of project methodology will force project manager to make on-the-fly decisions, based more on gut reactions than factual and objective analysis [12].

5.2 Poor Planning:

Planning is one of key factors that affect success of any project because "Fail to plan is a plan to fail" [12] Project manager should pay a lot of attention to this area and give it enough time and effort regardless of time pressure He should be aware of bad results when project plan is none-existent, out of date, incomplete or poorly constructed.

5.3 Poorly-Defined Project Scope (Unclear goals and Objectives)

Project manager should understand the compromise between what they want to accomplish and what they are actually able to accomplish [11] when goals exceed the ability to deliver timely results project will fail for sure.

5.4 Common scope mistakes:

The project problems start with the three most common scope mistakes [12]:

- Overrunning initial cost estimations
- Over- or underestimating project schedule (This is a double-edged sword: Set a large timeframe and run the risk of the project becoming obsolete by the time it's completed Set a small timeframe in relation to the amount of work required will put a strain on personnel)
- Miscalculating work to personnel ratio

5.5 Vague Requirements, Poor User Input, Lack of User Involvement:

Nothing kills projects faster than giving users something they didn't ask for and then pretending they did. IT teams may be given a vague and informal set of requirements, and they, in turn, may not bother to follow-up with users or ask any questions, as a result they will build what they believe is needed not what users need.

5.6 Scope Creep, Objective and Requirements Changes during Project:

IT projects suffer from two classical problems in project management:

- Scope creep
- Feature creep

Scope creep refers to uncontrolled and unexpected changes in user expectations and requirements as a project progress, while feature creep refers to uncontrolled addition of features to a system with a wrong assumption that one small feature will add nothing to cost or schedule.

5.7 Poor Architecture which is Inflexible for Any Change:

Any environment usually develops, and according to this development many issues may change such as strategies aligned to this environment objective, requirement...etc. The concept of what we are using today may be useless tomorrow is clear and understood.

5.8 Stakeholders' Conflicts:

All the stakeholders of the project should share similar business interests. It's a problem when the stakeholders work under the illusion that everyone is going to get everything that they want. They will contradict each other by their differences rather than going through conflict resolution in the early stages. The developers will expose the stakeholders' irreconcilable differences because.

Stakeholder conflicts can play many different roles in project failures. Often, stakeholders have personal reasons for not being able to work together.

5.9 Lack of Top Management Support and Involvement

Few IS development projects have the chance of getting off the ground without the support of those high up in the corporate food chain [13]. Without executive support the project managers in the organization will find a difficulty in aligning business with their projects.

5.10 Insufficient Budget and Bad Resources Allocations:

Financial threats are the result of poor budget forecasting and tracking, lack of interdepartmental charge backs, and ineffective tracking of resource and cost allocations 10 of 16 Insufficient budget is still a major reason for missing goals and objectives of projects within the quality framework that is required [12]. The concept for any project is like that project Y always need to be delivered tomorrow within X budget.

5.11 Poor Schedule Estimation, Unrealistic or Long Timescales:

Scheduling IS project work is an essential element of project management. A project schedule makes clear to all participants when work is expected to be completed. It also shows the time-related dependencies between different project tasks.

In a complex project, several schedules may be necessary, covering different levels of detail or different parts of the project Bad time estimation causes project related problems one common problem.

5.12 Communication breakdowns, Failure to communicate and act as a team:

IS development Projects sometimes fail because of improper communication between teamwork, in such cases they lack the ability to work as a cohesive unit and are in constant disagreement the arguments and infighting causes everyone to move in opposite directions.

Another common problem is the size of project team, there is a direct relationship between size of project team and difficulty in keeping all members of that team up to date on changes, progress, tools, and issues. Such problems are common on large projects, especially if people are working at different sites In many troubled projects there isn't one person who has an overview of the whole project Each project member needs to know how his or her one piece fits into the entire architecture.

5.13 Staffing (Inappropriate Skills, Lack of Number of staff):

Staffing is one of the most critical elements of a project's success. Without staff, there is no project. Once we have defined the project and are clear about at least some of the project's initial tasks, we can define our staffing needs. It's important to know the type of staff that the project needs, e.g., database administrator, one or more programmers, and technical writer.

The solution to skill-driven challenges is easy to define but difficult and expensive to accomplish [13].

5.14 Poor Testing:

The developers will do a great deal of testing during development but eventually users must run acceptance tests to see if the IS project meets their business requirements and this stage should be before the project implementation. In fact skip the testing phase because the project is way behind schedule will lead to a downright failure.

However testing often fails to catch many faults before a project goes live because [12]:

- Poor requirements which cannot be tested
- Poorly or non planned tests meaning that the project is not methodically checked
- Inadequately trained users who do not know what the purpose of testing is
- Inadequate time to perform tests as the project is late

5.15 Technology Illiteracy:

It's related to the failure in aligning business objectives with IT and its processes; this usually occurs when the company's internal controls have material weaknesses or when it is in non-compliance with various processes, because of that each project should have Internal or external auditors who have really an obligation to publicly report facts.

Sometimes adopting new technology may lead to a failure, even though it is successfully tested,

implementing it for the first time in the project is in itself a risk. Will the team use it in the right way? Will they have enough practice while they don't have expertise? Will it satisfy the project requirements?

5.16 Hidden Costs of going:

Any failure will be viewed as a direct result of underperformance, even though underperformance is not often a significant factor in the failure of most IS projects.

Instead, failed projects often have goals that were inherently unattainable, poor staff, etc

5.17 Late Failure Warning Signals:

The early project milestones involve diagrams, designs, and other documents that do not involve working code, these and other project milestones then go by or less on schedule, and testing may start more or less on time, so that errors which discovered days before the deadline of the project will cause the project not to be completed even close to its deadline.

6. A proposed Framework for governance of Successful IS Development projects implementation in Egypt:

To differentiate between the theoretical framework and conceptual framework, the theoretical framework of the study is a structure that can hold or support a theory of a research work. It presents the theory which explains why the problem under study exists. Thus, the theoretical framework is but a theory that serves as a basis for conducting research Purpose:

- It helps the researcher see clearly the variables of the study;
- It can provide him with a general framework for data analysis;
- It is essential in preparing a research proposal using descriptive and experimental methods.

The conceptual framework is the researcher's own position on the problem and gives direction to the study. It may be an adaptation of a model used in a previous study, with modifications to suit the inquiry. Aside from showing the direction of the study, through the conceptual framework, the researcher can be able to show the relationships of the different constructs that he wants to investigate.

In this research a framework was presented for governance successful IS development projects implementation in Egypt. The final list of this framework included 18 factors whose reliability and validity are tested by using it with corresponding 108 questions. These questions were distributed as 6 question per each factor grouped into four categories (Top management, Project, Organization and System) as a model, After that the model used for a five organizations through an implementation.

Based on the all the pervious frameworks as well as models [14], [15],[10] also through an extensive literary review, studying the CMMI , Waterfall and Agile methods ,in addition to interviews with IT managers having previous experience in managing IS development projects implementation and a faculty member with a good background in this subject , Eighteen (18) Critical Success implementation factors were identified (figure [1]) .

1- Management category factors

- F1: Senior Management Commitment
- F2: Leadership
- F3: Competence and BPR
- F3: Software process Improvement (SPI) objectives and goals

2- Project category factors

- F5: Staff Involvement
- F6: Experience Staff
- F7: Return on investment (ROI)
- F8: SPI awareness and Implementation methodology

3- Organization category factors

- F9: Organizational Culture
- F10: Organizational Politics
- F11: Communication and Collaboration
- F12: Wide Commitment
- F13: Resistance

4- System category factors

- F13: Allocation of Resources
- F15: Training and mentoring
- F16: Sustainability
- F17: Ease to use
- F18: Minimal Customization

In this study, a framework for governance of successful IS development projects implementation in Egypt was presented , this is done by Governance of the pervious factors and post-construction activities using IS governance concept and IS project governance items that are explained in our published paper "Governance of Post-Construction Activities in IS Development Projects" [10].

The final list of this framework included 18 factors whose reliability and validity are tested by using it with corresponding 108 questions, question one in each factor is divided into a number of sub questions related to post-construction activities. These questions were distributed as 6 question per each factor grouped into four categories (management, Project, Organization and System). After that this framework tested for 23 projects in Egypt.

This research concentrated on practical testing of the framework. This is mainly done through testing the reliability and validity of the framework by using it with corresponding questions.

After this statistical reports and figures about the outcome of each factor corresponding to 23 IS projects under study was described and statistical reports and figures about the outcome of the four categories (Management, Project, Organization and System) for all

organizations under study explained to indicating the average success rate for IS development success implementation.

6.1 Criteria for Framework success:

Along with a division of the known 18 factors into four categories (Management, Project, Organization and System) , our main concern while performing this study was to collect the factors that could be more beneficial to a developing country setting like Egypt. The final list included 18 factors, discussed in detail at our previously published paper [10] "Governance of Post-Construction activities in IS Development Projects"

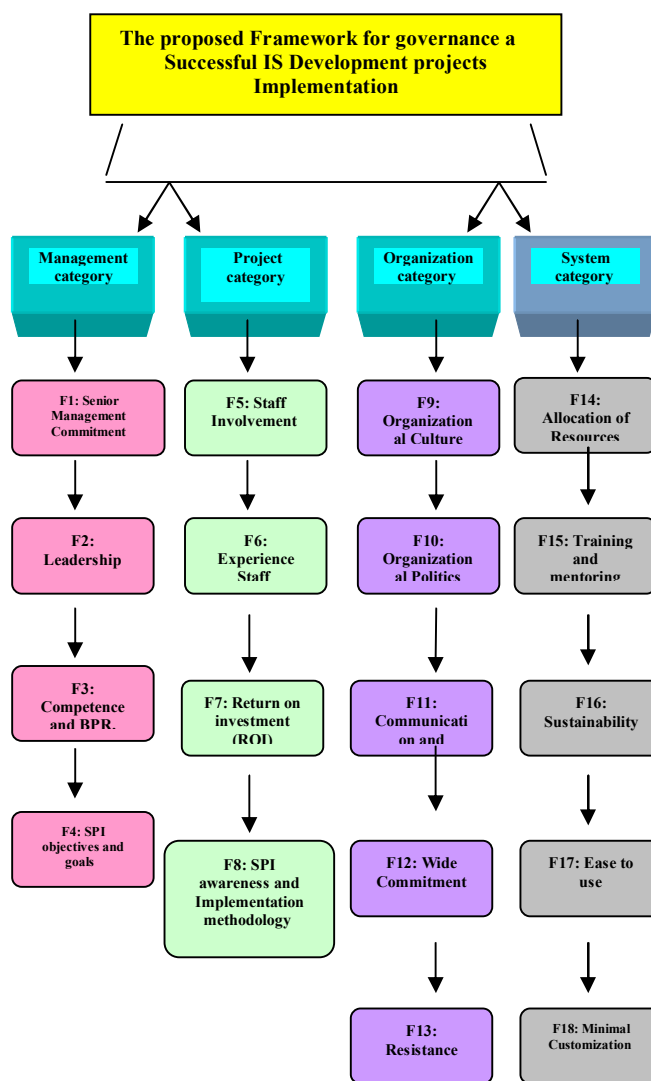


Figure [1] the proposed Framework

The responding organization should fulfil 67% percent of each factor (based on 6 questions per factor, three questions are (governing questions) and at least four questions must be replied by (Yes) as a positive reply except factor 13 (a resistance factor) must be replied by (No) to be a positive reply. First question on each factor is related to the post-construction activities and includes number of sub questions which also must achieve 67% of

success rate to be considered matching the successful criteria. The result will be 67%. That is, the probability of success of the project and so a text describing what the organization's strengths and weaknesses will be described according to the different factors, along with a quick-list of possible future managerial actions to strengthen the identified weaknesses. Data collection is done using a survey and interviews with major players of the large companies working in the Egyptian market. Findings show that certain factors have more significance in these organizations and their influences vary on the IS development Projects implementation. A description of the 18 Critical Success Factors with the corresponding four categories and the post-construction activities can be found in our previously published paper [10] "Governance of Post-Construction Activities in IS Development Projects".

7. Results of application of the governance framework

After Applying our framework about the Critical Success Factors (CSFs) that support IS Development Projects success Implementation on 23 IS development projects in Egypt, along with a division of the known 18 factors into four categories (Management, Project, Organization and System) the following results were obtained.

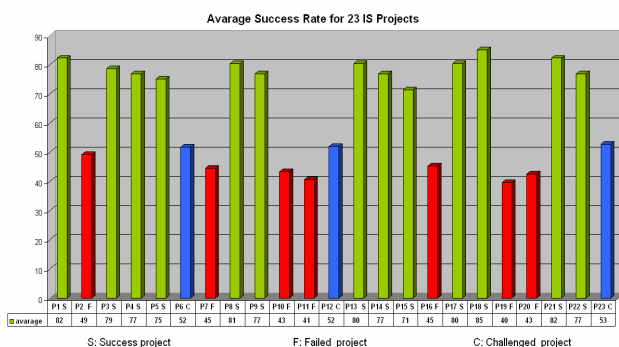


Fig.2 Average success rate for 23 projects

Fig. 2 shows that 57% of the projects (13 projects out of 23) considered as Success IS Development projects, 30% from the projects (7 projects out of 23) considered as Failed IS Development projects and 13% of the projects (7 Projects out of 23) are considered as challenged projects.

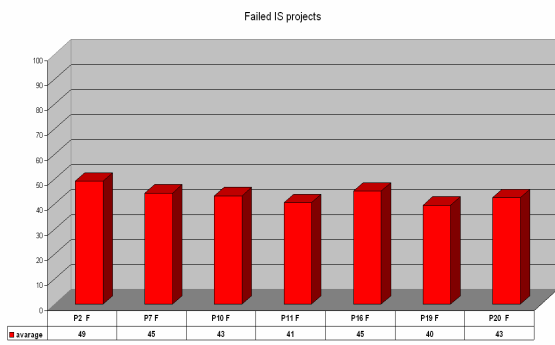


Fig. 3 Failed IS Development Projects

Fig.3 shows that 7 projects did not meet the criteria for success of the Governance framework, that indicates the failure of IS Development project implementation for these projects.

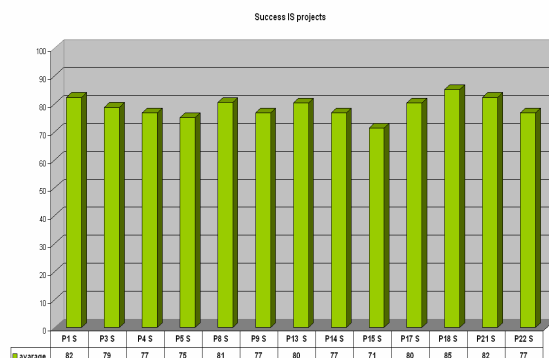


Fig.4 success IS Development Projects

Fig. 4 Shows that 13 projects meet the governance framework success criteria that indicate the success of these IS Development project implementation.

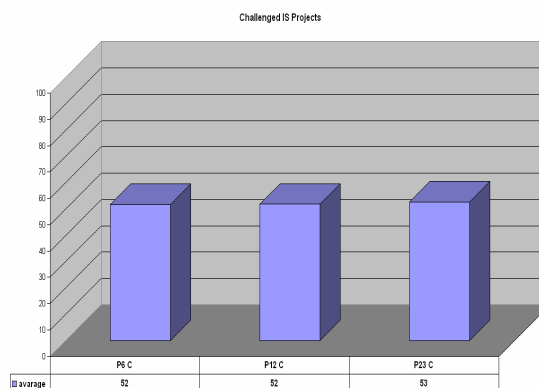


Fig. 5 Challenged IS Development Projects

Fig.5 shows that 3 projects did not meet the criteria for success of the Governance framework but achieve success rate greater than or equal to 50%, that indicates that these IS Development project are considered as Challenged projects.

8. Conclusion & Comparison between international and national results.

Many surveys provide statistical data over the rate of failure of IS development project over the last year. Out of all these studies, statistical data for the rate of failure of IS development projects over the last 19 years (from year 1993 until year 2011) is summarized as follows:

- Average success rate is 26.5%
- Average failed rate is 23.5%
- Average challenged rate is 40%

The national results shows that the rate of the IS development projects that failed and challenged in Egyptian environment is still very high. 44% of the national IS projects (10 projects out of 23) did not meet the criteria for success of the governance framework for IS development projects implementation (failed and

challenged). The international rate is 50%. This indicates that the rate of the national projects that did not meet the criteria for success of the governance framework for IS development projects implementation is better than the international rates.

IS development projects	National	International
Failed	30%	23.5%
Challenged	13%	26.5%
Success	57%	26%

Table [5] Comparison between international and national results.

Table [5] show that the national rates of failed IS projects are greater than the international rates.

Challenged national IS projects are nearly equal to 50% of the international rate of challenged IS projects, This is due to the inability of the culture of Egyptian organizations to differentiate between challenged and failed IS projects as sometimes they consider challenged projects as failed ones and at other times, they consider them as succeeded . Results show that the success project rate in Egypt is greater than the international rate because these projects ratio includes some of the challenged projects, also the organizations under study try to achieve the criteria for success by applying our governance framework for success of IS development projects implementation.

High failure rates continue to block the delivery of such benefits. Research to date often appears partial; focusing on only some aspects of system outcome and/or on certain specific implementation factors.

This research focuses on IS development software success implementation in Egypt. So, a governance framework was developed and tested to investigate the pervious point in literature and Egyptian culture of organization.

The common causes (CSFs) of IS development projects failure were divided into 10 factors.

The literature review did not focus on the details of the other factors.

Eighteen (18) Critical Success Factors (CSFs) for IS development projects implementation were identified and prioritized according to the Egyptian environment

9. Future Work

Due to the limited number of existing frameworks for IS projects implementation, more research is still needed to investigate the correlation between the Critical Success Factors (CSFs) for IS projects. Also, investigate the application of framework, described in this research on other industries, larger organizations, and technology driven IS projects investments.

Also our future study will be concentrated on building an expert system for the suggested framework to represent a self-assessment tool for IS projects implementers in Egypt. Combining both detailed case study and a large survey would be an ideal method for researchers in the IS development projects implementation field.

10. Appendixes

(Questionnaire related to the proposed Framework for governance of Successful IS Development projects implementation):

Hint: Bold questions in each factor are governing questions.

10.1 Management category factors

F1: Senior Management Commitment:

Questions that measure factor F1:

1. **Is this project management aware of**

- Implementation activity that refers to the final process of moving the solution from development status to production status.
 - Maintenance and enhancement activity as well as the detailed tasks included in each activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, etc...).
 - The 8-tasks of documentation activity.
 - IS Contract and issues related to post construction activities.
2. **Does the organization have a project management for the implementation project?**
 3. **Does the project management ensure that the management presents business and technical perspectives of the implementation?**
 4. Are there criteria for defining the beginning and end of the project?
 5. Are the project methodologies appropriate to the task and the organization?
 6. Is there a well structured approach in complex projects to set up and approve the project?

F2: Leadership:

Questions that measure factor F2:

1. **Is the leadership capable of preparing Preparing a Project time plan for:**

- Implementation activity that is refers to the final process of moving the solution from development status to production status.
 - Maintenance and enhancement activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, ...etc..).
 - IS Contract and issues related to post construction activities.
2. **Does the organization have a strong and committed leadership?**
 3. **Does the leadership have the ability to motivate the employees to change?**
 4. Does the leader build support for goals and projects from people who do not report to him and over whom he has no authority?

5. Is the leadership capable of determining whether the candidate's style is congruent with the culture of the organization?
6. Is the leadership capable of encouraging the team members to ask questions about various portions of the IS project?

F3: Competence and business process reengineering (BPR)

Questions that measure factor F3:

1. Does BPR pay attention at:

- Installation activity (Install, Modified, Repaired and Removed)
 - Integration activity tasks
 - Test activity tasks and what the essence of testing
 - Maintenance and enhancement activity
 - Risk Management activity
2. **Are the individuals in the organization broadly competent with IS related projects?**
 3. **Does BPR achieve improvements in cost, quality, service and speed?**
 4. **Does the IS software build on best practices that are followed in the industry?**
 5. Does the IS software involve the existing processes to align the best business standards?
 6. Does the organization have the principles for business process reengineering?

F4: SPI objectives and goals

Questions that measure factor F4:

1. Does the organization pay attention to :

- Maintenance and enhancement activity and does it know the detailed tasks included in each activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, ...etc..).
 - Security policy activity
 - Disposition activity
2. **Does the Organizational Strategy identify its Objectives, Initiatives and Goals?**
 3. **Does the organization have a clear, communicated business strategy?**
 4. Does the organization have an aligned IS strategy?
 5. Does the leadership build support for goals and projects from people who do not report to him and over whom he has no authority?
 6. Does the organization have an expected payoff (return on investment)?

10.2 Project category factors

F5: Staff involvement

Questions that measure factor F5:

1. Is the implementation staff aware of the post construction activities as follows :

- The Software training including training the users, administrators and technical staff.
- The Delivery Activity including Activities after the IS project is done and the client informed that the IS project is completed.
- The integration activity tasks.
- The test activity tasks and what the essence of testing.

- The Implementation activity that refers to the final process of moving the solution from development status to production status.
 - Maintenance and enhancement activity and does it know the detailed tasks included in each activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, ...etc..).
2. **Can the IS developers work with the implementation team to develop effective, successful customized training for the organization?**
 3. **Does implementations staff Monitor IS project and make adjustments where appropriate?**
 4. **Does implementation manager Listen actively to determine user needs, and Respond to their needs?**
 5. Are users acceptance of an IS Projects between users belonging to different departments similar?
 6. Are users acceptance of an IS Projects between users in different positions similar?

F6: Experience Staff:

Questions that measure factor F6:

1. Are the support staffs well oriented with the post-construction activities as follows:

- Four tasks of installation activity (Install Modified, Repaired and Removed).
- The Software training including training the users, administrators and technical staff.
- Delivery Activity including Activities after the IS project is done and the client is informed that the project is completed.
- The integration activity tasks.
- Test activity tasks and what the The essence of testing.
- Implementation activity that is refers to the final process of moving the solution from development status to production status.
- Maintenance and enhancement activity and does it know the detailed tasks included in each activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, ...etc..).
- IS Contract and issues related to post construction activities.
- Security policy activity.
- Risk Management activity.
- Disposition activity.

2. **Do the individuals in the organization represent different views and perceptions of the enterprise and the enterprise system?**
3. **Can the organization's members enhance the software application, handle bottlenecks, tweak and improve the system?**
4. Can the development team work together with the implementation team to develop effective,

successful customized training for the organization?

5. Are there criteria on which the success of the support team can be measured?
6. Are users acceptance of an IS Projects between user project implementation experiences similar?

F7: Return On Investment (ROI)

Questions that measure factor F7:

1. Does the organization have an expected payoff of:

- The integration activity tasks.
 - Implementation activity that refers to the final process of moving the solution from development status to production status.
 - Maintenance and enhancement activity and does it know the detailed tasks included in each activity (according to international standards CMMI, ISO 17799, NASA 2100, DOD 2167A, IEEE 1012, ...etc..).
 - IS Contract and issues related to post construction activities.
 - Security policy activity.
 - Risk Management activity.
2. **Is it possible to isolate the effects of any activity from any other activity?**
 3. **Are the indirect costs of the software (as the reduced productivity during the integration process and training sessions) generated within the business?**
 4. Does the ROI process result in recommendations for improvement?
 5. Does the ROI simple for most learning and HR professionals?
 6. Is it true that the ROI process does not reveal program weaknesses or strengths?

F8: SPI awareness and Implementation methodology

Questions that measure factor F8:

1. Are there guidelines to define each one's duty at the:

- Implementation activity.
 - The Maintenance and enhancement activity..... According to international standards CMMI, ISO 17799, NASA 100, DOD 2167A, IEEE 1012...etc..).
 - Security policy activity.
 - Risk Management activity.
 - Disposition activity.
2. **Does the organization have previously defined and well communicated project methodology?**
 3. **Does the project methodology envelop clear performance measurements with routines for monitoring progress?**
 4. Does the organization determine which Partners or Collaborators will be needed?
 5. Does the organization determine which Specific Information or Advice will be needed?
 6. Does the project methodology envelop documentation procedures?

10.3 Organization category factors

F9: Organizational Culture

Questions that measure factor F9:

1. Does the organization have a strategy for

- Four tasks of installation activity (Install, Modified, Repaired and Removed).
- Delivery Activity including Activities after the project is done and the client is informed that the project is completed.
- The Implementation activity.
- The Maintenance and enhancement activity.
- Disposition activity.

2. Does the organization have a business culture highlighting the importance of learning, knowledge, past experience and change?

3. Do top managers rely on the implemented information system?

4. Is cooperation across different functional areas in the organization entailed by IS projects achieved?
5. Does the organization have an effective design of lateral links?
6. Does the organization have a strategy for knowledge management?

F10: Organizational Politics

Questions that measure factor F10:

1. Does the organization have an explicit change management strategy for

- Delivery Activity.
 - The Maintenance and enhancement activity and does it knows the detailed tasks included in each activity.
 - The-8 tasks for documentation activity.
 - The Security policy activity.
 - The Disposition activity.
2. **Does the organization have common pitfalls when implementing organizational change?**
 3. **Does the organization have willingness and readiness for change?**
 4. Does the organization have tools to minimize resistance from middle management in implementing this change?
 5. Does the organization have buzzword necessary to be implemented?
 6. Are there criteria for designing and innovating the overall work system?

F11: Communication and Collaboration

Questions that measure factor F11:

1. Are there criteria to Identify Areas that need Improvement at

- The Software training including training the users, administrators and technical staff.
 - The "Delivery Activity" including Activities after the project is done and the client is informed that the project is completed.
 - The" integration activity" tasks.
 - the" test activity"
 - The" Implementation activity".
 - The Maintenance and enhancement activity.
2. **Is there a detailed communication plan and strategy within the organization?**

3. **Does this plan (if present) ensure the successful communication of project plan and progress to all relevant stakeholders?**
4. Are there Critical Strategic Communications Practices within the organization?
5. Are there criteria for assessing Current Performance and Capacity?
6. Are there criteria to Identify Possible Levels of Practice?

F12: Wide Commitment

Questions that measure factor F12:

1. Is there a prepared list to detect the required items for

- The four tasks of installation activity (Install Modified, Repaired and Removed).
 - The integration activity tasks.
 - the "test activity"
 - The Implementation activity.
 - The Maintenance and enhancement activity.
 - The Disposition activity.
2. **Does the organization have an IS Systems that integrates information and information based process within and across all functional areas in the organization?**
 3. **Are the IS persons and departments responsible for the overall system?**
 4. Are the key users from different departments ensured to commit to the project implementation?
 5. Are these departments frequently being called back to their prior functional job position?
 6. Is the global team well trained on the IS development software?

F13: Resistance:

Questions that measure factor F13:

1. Does the company have high tolerance for change for

- The four tasks of installation activity (Install, Modified, Repaired and Removed).
 - The integration activity tasks.
 - The test activity.
 - The Implementation activity.
 - The Disposition activity.
2. **Do the IS systems introduce large-scale changes that cause resistance?**
 3. **Does this resistance decrease the expected benefits of the system?**
 4. Is there in the company any parochial self interest?
 5. Is there in the company any misunderstanding and lack of trust?
 6. Does the company introduce a single method for assessment?

10.4 System category factors

F14: Allocation of Resources:

Questions that measure factor F14:

1. Have roles & responsibilities been firmly established for

- The integration activity tasks.
- The Maintenance and enhancement activity.
- The 8- tasks for documentation activity.

- The IS Contract and issues related to post construction activities.
 - The Security policy activity.
 - The Risk Management activity.
2. **Are there available resources (\$) to develop systems and hire & train skilled personnel?**
 3. **Is there a capacity (data systems & infrastructure) to collect reliable data & report credible information?**
 4. Is there an adequate analytical capacity (skilled personnel)?
 5. Is there a Policy and a set of Standards in place that describe roles, responsibilities & expectations of the operation of the IS Projects?
 6. Is the IS projects "that gets reported" credible, timely & responding to the priority issues?

F15: Training and mentoring

Questions that measure factor F15:

1. Does the organization strategy involve routines for early hands on training

- The employees at installation activity (Install Modified, Repaired and Removed).
 - The employees (the users, administrators and technical staff).
 - The employees at integration activity tasks.
 - The employees at test activity.
 - The employees at Implementation activity.
 - The employees at IS Contract and issues related to post construction activities.
2. **Is there a clear educational strategy concerning the SPI implementation?**
 3. **Are there definite training issues in implementing a new IS projects?**
 4. Is the training curriculum designed for the new organizational roles and tasks?
 5. Is the training customized for your specific business?
 6. Are the learning materials developed by experienced instructional designers and tailored to different learning styles?

F16: Sustainability

Questions that measure factor F16:

1. Does the organization use sustainability at?

- The Software training including training the users, administrators and technical staff.
 - The Maintenance and enhancement activity.
 - The 8- Tasks for documentation activity.
 - IS Contract and issues related to post construction activities.
2. **Does IS software Improve branding and transparency with advanced reporting?**
 3. **Does the organization improve the bottom line with positive sustainability impacts?**
 4. Does the organization improve the top line with a sustainable portfolio approach?
 5. Are the organizations that fall into this category the most mature, and have shifted their approach from cost to revenue?

6. Are Innovators looking forwards to improving their top-line?

F17: Ease to use

Questions that measure factor F17:

1. Does the organization have a strategy to make the Activity easy to use?

- The Delivery Activity.
 - The Implementation activity.
 - The Maintenance and enhancement activity.
 - The 8-tasks for documentation activity.
 - The Disposition activity.
2. **Do the User concerns and issues set the balance and priorities in creating Usability goals?**
 3. **Do the software developers continuously improve their products with new features?**
 4. Does the organization select the IS systems that are easy to train new employees on and easier to support?
 5. Does the organization rank highest in decision criteria especially when one product looks a lot easier to use than another?
 6. Does the application content of an IS systems software exceed the expectations of buyers?

F18: Minimal customization

Questions that measure factor F18:

1. Does the organization minimize customization of

- The training for the employees (the users, administrators and technical staff).
 - The Implementation activity.
 - The Maintenance and enhancement activity.
 - The IS Contract and issues related to post construction activities.
 - Early hands-on training for the employees at the Disposition activity.
2. **Does the organization differentiate between the two key types of customizations - usability and functionality?**
 3. **Does the organization understand that the issue of customization has been plaguing the IS systems industry since its inception?**
 4. Does the Organization deploy an IS software that is being customized to fit their needs?
 5. Does the organization know the Reasons for IS software customization prior to “going-live” and after “going-live”?
 6. Do the organization Factors include the need to address strategic and cost implications, organizational adaptation to IS software functionality, deploying strategies to minimize customizations?

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