Governance of Post-Construction Activities in IS Development Projects

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Abstract

Researches continually show that many information systems (IS) development projects all over the world have difficulties to be completed on time or on budget or on scope, In fact many of them are cancelled before completion or are not implemented. Project success is affected by many factors such as project team, suppliers, Customers and stakeholders.
So a governance model for IS development projects implementation was developed and tested, by governance of Post-Construction activities in IS development Projects.

The implementation of governance model covering factors can be divided into 4 categories (Management, Projects, Organizations, and Systems) to assess the influence of Critical Success Factors (CSF's) on the implementation of IS projects on large companies in Egypt.

Our main concern while performing this study was to collect the factors that could be more beneficial to a developing country setting like Egypt.

Keywords:

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

1. Introduction

Some of IS projects have a bad reputation for going over budget and schedule, not realizing expectations and for providing poor return on investment [1],[2],[3],[4],[5].Surveys and reports on the acceptability of new IS projects seem to highlight constantly the same problems and probable causes of failure of large and small businesses, continuality of making mistakes when attempting to improve information systems and investing in inappropriate or unworkable changes without proper consideration of the likely risks.

Some Information systems projects frequently fail. According to the academic studies, the failure rate of large projects is between 50%-80% [6]. This is due to the natural human tendency to hide bad news; the real statistic may be even higher.

It was reported that 75% of the ERP projects are classified as failures [7]. 51 % viewed their ERP implementation as not fully completed. Based on the ERP survey conducted by many researchers, the average cost of ERP ownership were $15 millions ranging from half millions to $300 millions [7]. The average cost per user per year could be as high as $20,000. However, there are also frequent reports of ERP failure: "between 50 percent and 75 percent of U.S. firms experience some degree of failure".

Our first aim in this work is to Studying the detailed tasks included in each activity of post-construction phase (according to international standards, what are the causes of IS projects failure, The effect of IS Projects failure, what is the Most important ways to avoid IS projects failure and what are the Critical Factors toward achieving a successful IS projects implementation.

The second aim in this work is to explain the reasoning behind the development of a governance model for management successful implementation of IS development projects including the factors that achieve implementation success.

Last aim of this research to supporting IS projects to be completed successfully by applying Governance on the post-construction activities

2- Background & literature review

2.1 Success and Failure of IS development Projects:

IS development projects fail when they do not meet the criteria for success. Most of the IS 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 [8].

Success and failure may vary over the life of a IS project and it is not always obvious when we should make a yes/no assessment [9].

Furthermore it may be almost impossible to find agreement about whether a project succeed or failed. The notion that a project failed may mean that it did not meet certain people's objectives or that it produced what were seen by some as undesirable outputs [10].

According to the Standish Group research [11], IS projects category definitions are as follows:

• **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.

• **Challenged projects** were completed and operational, but over-budget, over the time estimate, and with fewer features.

The Standish Group research confirms that large projects are more likely to fail than small projects [11]. That is likely because large projects tend to be more complex. Although during the last years the success rates of IS projects increased, and failure rates of them decreased, but the numbers still indicate a problem.

By using the definition of the IS projects, these projects fail when they do not meet the criteria for success [8]. According to the Standish Group [11],[12] , these studies present tables to indicate the project success factors, Project Challenged Factors and the Project Impaired Factors.
IS project success can be classified by four views [13] (the system, the users, the organization and the strategic view) of short-term and long-term objectives (Table [4]). Ewusi-Mensah [14] states that IS projects are unique in that they are conceptual in nature and require the intense collaboration of several different groups of stakeholders including IS staff, users and management.

	System	User	Organizational	Strategic
Short-term Objectives	Reliable (bug-free) system	Satisfying user needs	Improving the effectiveness of business operations	Improving customer service
Long-term Objectives	Easily maintainable system	Improving productivity of managers	Generating operational benefits	Enabling cooperative partnership

Table [4]: A classification of short and long-term objectives

3. IS Governance Concept:

The IS Governance Institute defines IS Governance as 'An integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IS sustains and extends the organization's strategies and objectives'.

Governance on Information and Communication
Technology (ICT), Australian Standards Association: Draft Standard DR01498, Corporate Governance of Information Communication Technology, outlines the following guiding principles

1. Establish clearly understood responsibilities for ICT.
2. Plan ICT to best support the organization.
3. Acquire ICT validity.
4. Ensure that ICT is of the required quality.
5. Ensure that ICT performs when required.
6. Ensure that ICT conforms to the formal rules.
7. Ensure that ICT use respects human factors.

3.1 IS Project Governance items

Project governance items include [15]:
i. Definition of scope and goals
ii. Sound project management.
iii. Project methodology [16].
iv. Experienced project manager, small milestones [17],
v. Realistic schedule and well defined project objectives [15].
vi. Attention to the stages of project management
vii. Clear roles and responsibilities, integration and testing [15]
viii. Application domain experience

4. IS post-construction activities:

Major phases of IS development projects can be classified into three phases:
1. Pre-construction / pre-development phase
2. Construction / development phase
3. Post-construction / deployment phase

This research focuses on (post-construction phase)

the IS post-Construction activities [18] which is divided into two categories
1. IS projects post-Construction Deployment activities
2. IS projects post-Construction closing activities

1- 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

2- 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

4-1 Tasks of IS projects post-Construction Deployment activities

A1: Security policy activity :

This policy refers to the integrity, availability, confidentiality, Non-repudiation, Risk management and accessibility of information and communications systems, software and associated data Information security means protecting information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction ISO 17799 defines a security

policy as a document providing management direction and support for information security in accordance with business requirements and relevant laws and regulations. During the software development process it is important to use these policies as a guide for all security features that will be developed.

ISO 17799: The Key Components of the Standard: the Standard is divided into 2 parts:

- ISO 7799 Code of Practice for Information Security Management
- BS 7799 Part II Specifies requirements for establishing, implementing and documenting Information Security Management System (ISMS)

The standard has 10 Domains, which address key areas of Information Security Management.

1. Information Security Policy for the organization.

This activity involves a thorough understanding of the organization business goals and its dependence on information security.

2. Creation of information security infrastructure

A management of the governance model needs to be established to initiate, implement and control information security within the organization. This needs proper procedures for approval of the information security policy, assigning of the security roles and coordination of security across the organization.

3. Asset classification and control

One of the most laborious but essential task is to manage inventory of all the IT assets, which could be information assets, software assets, physical assets or other similar services.

4. Personnel Security

Human errors, negligence and greed are responsible for most thefts, frauds or misuse of facilities. Various proactive measures that should be taken are, to make personnel screening policies, confidentiality agreements, terms and conditions of employment, and information security education and training.

5. Physical and Environmental Security

Designing a secure physical environment to prevent unauthorized access, damage and interference to business premises and information is usually the beginning point of any security plan.

6. Communications and Operations Management

Properly documented procedures for the management and operation of all information processing facilities should be established. This includes detailed operating instructions and incident response procedures.

7. Access control

Access to information and business processes should be controlled on the business and security requirements. This will include defining access control policy and rules, user access management, user registration, privilege management, user password use and management, review of user access rights, network access controls, enforcing path from user terminal to computer, user authentication, node authentication, etc.

8. System development and maintenance

Security should ideally be built at the time of inception of a system. Hence security requirements should be identified and agreed prior to the development of information systems.

9. Business Continuity Management

A business continuity management process should be designed, implemented and periodically tested to reduce the disruption caused by disasters and security failures.

10. Compliance

It is essential that strict adherence is observed to the provision of national and international IT laws, pertaining to Intellectual Property Rights (IPR), software copyrights, safeguarding of organizational records, data protection.

A2: Installation Activity

The installation activities represent the steady state of the software on the computer. Administrators want the software installed correctly on the users' computers to manage this steady state, software is:

- **Installed**: This includes copying the necessary files, initial configuration of the registry, and the creation of the desktop and Start menu shortcuts that allow users to find and use the software.
- **Modified:** This involves adding or removing features after the initial installation.
- **Repaired**: This involves keeping the software in a working state without regard to what happens.
- **Removed**: This involves completely and safely removing the software from the computer when it is no longer needed, including the removal of all the files, registry entries, and shortcuts.

A3: Integration activity :

Part of the Software Development Life Cycle (SDLC) the Testing and Integration Phase is when the various disparate components of the system are integrated together and systematically tested as a whole

Not only is the product tested by final end users to ensure the product meets the specified functional requirements, but it is also tested by the developers and Quality Assurance staff (Test Engineers) to ensure that it is resilient, and capable of sustaining the amount of projected use as specified in the requirements.
State the integration of developed and legacy systems: for customers who depend on legacy systems, must system deliver integration four ways:

Products: Providing innovative features and technologies such as managed data providers for other databases Bridge for host systems.

Community: Working together with customers, partners, and competitors to develop cross-platform solutions that meet customers' shared interoperability needs, promote technology innovation, and promote competition in the IT industry.

Access: Licensing technology assets to and from other companies and offering key technologies including Web services standards under the Open Specification Promise

Standards: Supporting industry and technical standards for data formats and messaging protocols and actively participating with leading standards-setting organizations to promote technology adoption

A4: Test activity:

The Test Phase is towards the end of the traditional waterfall development process. However, hopefully this is not the first time we have thought about testing. Depending on the characteristics of our IS project, we may already have created an initial. Testing strategy in the analysis phase and a testing Plan in the design phase. We would have already performed initial unit testing in the Construct Phase. Now, however, we are ready for the standalone testing process that belongs in the test phase. There are a number of specific tests that can be part of the testing process the specific ones our solution needs will be defined in our testing strategy and plan. The Testing Process includes the following activity: [20]:

1- Validate Test Coverage
2- Integration Testing
3- System testing that includes:

a. Performance Testing	b. Training Testing
c. Stress Testing	d. Interface Testing
e. Security Testing	f. Disaster Recovery Testing
g. Requirements Testing	h. Multi-Site Testing
i. Usability Testing	j. Installation Testing
k. Documentation Testing	

4- Acceptance Testing
5- Re-plan for the Remainder of the Project
6- Obtain Approval to Proceed

More Test activity including the following:

- Resolving Bugs
- Testing Metrics
- Managing the Test Environment
- Regression Testing
- Automated Testing
- Managing Test Cases

A5: Implementation activity:

Part of the Software Development Life Cycle (SDLC): after the system has been tested during the Testing Phase, and accepted by the user, the system is installed and made operational in a production environment, in accordance with the requirements. Projects, especially software development projects, can be a challenge from start to finish [**Error! Reference source not found.**2020]. Implementation refers to the final process of moving the solution from development status to production status. Depending on our project, this process is often called deployment, go-live, or installation for the purposes of Lifecycle step, and all of these terms are synonymous with "implementation".

A6: Documentation activity

IS projects Documentation activity includes:

a) Project Management Documentation
b) Quality Assurance Documentation
c) Configuration Management Documentation
d) Verification and Validation Documentation
e) Test Documentation
f) Requirements Documentation
g) Design and Implementation Documentation
h) Reporting

Preparing and transmitting documents connected with final payment, the organization of operation and maintenance manuals, assembling record drawings, Contractor follow-up, Owner move-in or start-up, Contractor call-back, and Contractor close-out.

Project documentation may include many kinds of documents (e.g., plans, task reports, development products, problem reports, phase summary reports) [21]

This report expands upon the documentation requirements in [ASMENQA2]. While minimum content requirements are provided for several documents (which include the [ASMENQA2] requirements), some documents may be presented together as a single document. Each of the planning documents may be kept simple and short, but the basic information identified in the recommendations should be addressed.

a) Project management documentation: The following recommendations for project management documentation are based on [IEEE1058] [22].

Project Organization : Process Model Relationships between project activities Specification of timing of major milestones, baselines, reviews, work products, project deliverables, and sign-offs. Definition of project initiation and termination activities

Organization Structure : Description of the internal management structure including authority, responsibility, and communication

Organizational Boundaries and Interfaces Project: Boundaries with other entities (customer, subcontractors, other system components) Interfaces of SCM, SQA and SV&V

Project Responsibilities: Description of major project activities and who has responsibility for each activity

b) Software Quality Assurance Documentation (SQAP):

[ASMENQA2] and the IEEE standards are intended for specific projects, and therefore do not address a vendor's quality management program. A plan based on [ASMENQA2] may reference the vendor's general quality

management program (e.g. one based on [ISO9000]) that indicate, Comparison of Requirements Project Management [23],[24].

c) Configuration Management (SCM) Documentation

There are several SCM documents that should be produced. The SCMP should describe how the SCM activities (configuration identification, configuration control, status accounting) will be conducted and documented. The other documents report on the SCM activities. The Software Configuration Management Plan (SCMP) may exist as a generic plan which can be referenced by any project. Even on a small project it is easy to lose track of the relationship between tested software modules and modules in which software units have been changed. The following recommendations for an SCMP are based on [IEEE828] are used not only because of its merits but also because it is serving as the base document for an international standard in ISO/IEC JTC1 SC7 on Software Engineering. Recommendations for the other SCM documents are available on [IEEE828] and Software Verification and Validation (SVVP) Documentation are available on [IEEE1012].

d) Verification and Validation (SVVP) Documentation

For large or long term projects, the SVVP and the detailed test documentation should be separate documents. For small projects, while the initial planning and SVVP should be completed during the requirements phase, additional information regarding the SV&V tasks, test designs, case, and procedures may be added to the SVVP later. There are several types of SV&V documents that should be produced [23],[24].

e) Testing Documentation

Although test plans for component, integration, and system testing are usually separate documents, for small projects they may be presented together in one document. In these cases, the document should contain separate, complete sections for each type of testing, since the objectives and test strategies for each type of testing will still differ. Such an arrangement should be specified in the computer SVVP. The following recommendations for Test documentation are based on [NASA2100], [DOD2167A], and [FUJII] and Recommendation for maintenance documents is available on [EWICS2] and [IEEEP1219]

f) Software Requirements Specification (SRS)

The purpose of the SRS is to provide a description of the software However; the SRS should also describe the relationship of the software component with the rest of the system. The description may include a graphical representation and an overview description of the services the software provides for the system However, this information is not sufficient for any reviewer to judge the capability of the software to fulfill the overall system requirements.

g) Design and Implementation Documentation

In general, design rules will also be implemented by the source code (e.g., the modularity features and complexity of the design should transfer to the source code) It is important to ensure that the vendor's plans for modularity and complexity are stated in the design documentation and the modularity and complexity of the design are not lost during implementation This report addresses design and implementation/source code in two separate documents

h) Reporting

The purpose of reporting is to communicate to others information on specific deficiencies in the software or to summarize specific tasks or groups of tasks performed during development (e.g., SQA activities and SV&V activities) These reports should be used during formal reviews that assess the current product and development activities, as well as to improve the development process for future projects. Reports should be generated as necessary (e.g., for each anomaly or at the completion of each major task) There is no set number of required reports, however, the vendor should avoid producing an overabundance of unnecessary reports.

4-2 Tasks of IS projects post-Construction closing activities

A7: Post-construction tasks in contract management activity

Reviewing the post Construction issues that should be addressed in the contract

1. Project closing activities

Co-ordinate and expedite the completion of project submittal requirements prior to contract close-out, including certificate of substantial completion, completion of punch list work, guarantees/warranties.

2. Final Cost Report activity

Final Cost Report summarize total Project costs in a final report, listing all change orders and identifying any unresolved issues which may have a cost impact.

3. Final Payment activity

When the project manager has completed all punch list items, we will arrange with the software house and the Client for a final inspection of the facility.

A8: Risk Management activity:

Risk management is the process of assessing risk, taking steps to reduce risk to an acceptable level, and maintaining that level of risk. Managers analyze risks for many aspects of their business; they consider alternatives and implement plans to maximize returns on their investments. A risk management process for information systems enables managers and their organizations to build an in-depth knowledge about their systems and how they are interrelated. Many of the documented approaches to risk management advocate a process or cycle of stages 19]. An overview of the main stages recommended in most of these approaches is given below:

- Risk Prioritization ranking
- Risk Management Planning
- Risk Resolution
- Risk Monitoring and Control

A9: Training and Support activity:

Software Training and Support is important because a large percentage of software projects fail because the developers fail to realize that it doesn't matter how much time and planning a development team puts into creating software if nobody in an organization ends up using it. People are often resistant to change and avoid venturing into an unfamiliar area, so as a part of the deployment activities, it is very important to have training classes for new clients of the software. Software training includes training the users, administrators and technical stuff.

A10: Delivery Activity:-

In these activities after the project is done the client informed that the project is completed. This is called as the Software Delivery Note. The project is tested by client and is called as the Testing. The project is installed in client environment and there, testing is done and called Port Testing in Software Testing. While installing, if any problem occurs, the maintenance people would write the Deployment Document (DD) to Project Manager (PM)

A11: Maintenance activity:

The installed system is monitored to ensure it performs as defined in the requirements, and any modifications needed to do so are incorporated. In addition, the system is being periodically assessed through In-Process Reviews to determine how the system can be improved.

Maintenance and enhancing software to cope with newly discovered problems or new requirements can take far more time than the initial development of the software. It may be necessary to add code that does not fit the original design to correct an unforeseen problem or it may be that a customer is requesting more functionality and code can be added to accommodate their requests.

Software maintenance in software engineering is the modification of a software product after delivery to correct faults, to improve performance or other attributes, or to adapt the product to a modified environment [18].

According to Categories of maintenance in ISO/IEC 13763, six software maintenance processes can be described as the following:

- The implementation processes
- The problem and modification analysis process,
- The process considering the implementation of the modification itself
- The process acceptance of the modification,
- The migration process
- The retirement of a piece of software

To avoid project failure at Operations and Maintenance Phase, there are a number of processes, activities and practices that are unique to maintainers and must be followed:

Maintenance in ISO/IEC 13763

E.B.Swanson [25] initially identified three categories of maintenance: corrective, adaptive, and perfective. These have since been updated and ISO/IEC 13763 presents:

- **Corrective maintenance**: Reactive modification of a software product performed after delivery to correct discovered problems.
- **Adaptive maintenance**: Modification of a software product performed after delivery to keep a software product usable in a changed or changing environment.
- **Perfective maintenance**: Modification of a software product after delivery to improve performance or maintainability.
- **Preventive maintenance**: Modification of a software product after delivery to detect and correct latent faults in the software product before it's become effective faults.

A12: Disposition activity:

When the system is terminated, it must be done in an orderly fashion, in order that it can be reactivated in the future if needed. Particular emphasis is given to either migrate the data to another system, or archive the data in accordance with applicable records management regulations and policies, for potential future access.

A project initiates disposition activities at the conclusion of its lifecycle when determination is made to retire the system. When retiring the system, the project team typically performs the activities identified in next section. Disposition key Activities including the following [26]:

- Plan system disposition
- Publish Notice of Deletion in the Federal Register
- Retire system and archive system components, data, and documentation
- Close out the project

5. Critical success implementation factors

Based on the all the pervious frameworks as well as models [27], 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 projects implementation and a faculty member with a good background in this subject, Eighteen (18) Critical Success implementation factors were identified as follows:

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 ,Governance & Management model of successful IS development project implementation in Egypt was presented, the final list of this model included 18 factors whose reliability and validity are tested by using it with corresponding 108 questions, question one in each factor is divided into 7 sub question related to common post-construction activities. These questions were distributed as 6 question per each factor grouped into four categories (management, Project, Organization and System). After that we this governance model for 23 projects at five big organizations in Egypt was used.

5.1 Criteria for Success the Proposed Governance Model

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 later.

The responding organization should fulfill 67% percent of each factor (based on 6 questions per factor, three questions (governing questions) and at least four questions must be replied by (Yes) as a positive reply except factor 13 (resistance factor) must be replied by (No) to be a positive reply. First question in each factor is related to the post-construction activities and includes number of sub questions which also must achieve 76% success rate to be considered matching the successful criteria. The result will be 67%. Which is the probability of success of the project .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, a total 23 IS development projects. 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 factors with the corresponding four categories can be found in the following section:

5.2 Management category factors

F1: Senior Management Commitment:
Senior management commitment is most cited factors in the most literatures [27]. Management commitment and support is one of the most important factors that can play a vital role in successful implementation of software process improvements (SPI) and initiative program. Without management support, progress cannot be granted. It is the level of commitment which higher management ensures to support at all the operating levels of the organization that sponsors the change in order for successful implementation of SPI assessment.

F2: Leadership:
The organization should have a strong and committed leadership that has the ability to motivate the employees to change [29][30].

F3: Competence and Business process reengineering (BPR)
The organization should have individuals with a broad competence of IS Projects [31], BPR or other IT-related projects involved in both the steering committee and the entire project. BPR is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed" IS Projects are built on best practices that are followed in the industry Implementing an IS Projects involves reengineering the existing business processes to align the best business standards [32].

F4 SPI objectives and goals
It is necessary for organization to set realistic & relevant objectives and goals for SPI. These objectives need to be crystal clear and, SPI managers need to communicate to all the actions groups within the organization. Establishing the realistic objectives means that goals seem to be achieved in the near future and its objectives and goals are not too ambitious. It demands that the expectations should be clear and the expected results need to be communicated at all the levels of the organization [27].

5.3 Project category factors

F5: Staff involvement
Staff involvement is among a key factor which helps to facilitate successful SPI program. This is agreed by many researchers such as [27], Authors explore different aspects of staff involvement CSF in their studies and provide some in-depth knowledge and idea about how the staff participation and involvement leads us to successful implementation of SPI and in the evaluation process, and assessment of its initiative in change management.

F6: Experience Staff:
The number of researchers on the basis of their collected sample studies data, emphasis on how a software process skills, experience and staff expertise can play a key role in successful implementation of SPI program. In experienced staffs, practitioners consider hurdle in SPI and emphasize to equip them with the necessary training that transfers the right SPI skills that enable them to mastery it in use. The main goal for this training should be

to transfer the knowledge of SPI inter-related activities with business objective and organization goals [28], [27].

F7: Return On Investment (ROI)

The organization should have an Achieving expected payoff (Return On Investment) Calculating return on investment, (ROI), which is based on comparing the costs of implementation to the benefits that you will receive by the integration of an ERP software package into your business structure. While the direct costs of the software itself, installation, training, and support can generally be quantified by the vendor, there are other indirect costs that will be generated within the business, such as reduced productivity during the integration process and training sessions.

F8: SPI awareness and Implementation methodology

According to "Critical Success Factors for Software Process Improvement Implementation: An Empirical Study" research 28] to fully understand the benefits of SPI, there is need to sponsor the SPI awareness program i.e. "ROI and impact", practitioner belief that SPI implementation is basically taking on board the organization best practices. Consequently, it is essential to address the SPI awareness activities and transfer the share knowledge among different groups who are actively engaged in process activities [27][28].

5.4 Organization category factors

F9: Organizational Culture

Culture difference exists between different countries that are not necessarily suited or accepted by people living in other countries. Moreover, specific cultures adopt, without considerations of that organization, original values from these countries customs and practice. Organizations will continuously face problems in implementation and deploying of best practices, majority of these problems belong to "people, group, team and community culture and behavior" [27].

10: Organizational Politics

Several researchers' consider politics as barrier in SPI implementation because SPI aim is to bring a change in the organization and people do often resist the change. This is because SPI initiatives goals may suit to one group's goals but collide with other groups or teams goals. The reason is that the organization comprises of different groups and they have different priorities and goals that do not match with the SPI initiatives goals and this leads to oppositions from those people [27].

F11: Communication and Collaboration

Communication and Collaboration are considered to be amongst the most influential factors, which affect the SPI process. Some researchers [28] defined these factors as: "Degree to which communication efforts precede and accompany the improvement program (communication) and degree to which staff members from different teams and departments cooperate (collaboration)"

F12: Wide Commitment

The IS Projects should be enterprise wide i.e. it should integrate information and information based processes within and across all functional areas in an organization. It's imperative to get support from all functional segments of the organization. (Every person and department is responsible for the overall system .Key users from different departments are ensured to commit to the project implementation without being called back to their prior functional job position frequently [33].

F13: Resistance:

The organization should have an IS Projects usually introduce large-scale changes that can cause resistance, which may in turn decrease the expected benefits of the system. Previous IS research has made substantial progress in understanding how resistance affect IS [27].

5.5 System category factors

F14: Allocation of Resources:

The management commitment can be determined by the degree to which management seem ready to make available the resources for SPI and it is considered one of the strong indicator of management commitment towards SPI [27], (Senior management sponsorship is essential for the assessment and recommendations, that means, higher management must show their strong commitments in developing, financing and implementing the actions plan.

F15 : Training and mentoring

The organization should have a clear educational strategy concerning the SPI implementation that involves routines for early hands on training for the employees [34].

F16: Sustainability

What requirements/safeguards are there to ensure that an Monitoring & Evaluation system will be made sustainable (i.e. Allowed to continue over time)?

F17: Ease to use

The organization should have a strategy to select the IS project ease of use .Ease of to use is the degree to which a particular system is perceived to be relatively free from physical and mental effort. Previous is Research found that ease of use has an impact on the intensions to use IS projects.

F18: Minimal customization

Taming the package causes extra additional customization costs, inability to benefit from vendor software maintenance and upgrades, and inability to benefit from the standard best practices encapsulated in the package [33].

6. Critical Success implementation factors belong to the Post-Construction Deployment Activities.

Matrix of Eighteen (18) Critical Success implementation factors belong to the Post-Construction Deployment Activities in IS Development Projects.

CSF / Activity	A1	A2	A3	A4	A5	A6
F1: Senior management Commitment					*	*
F2: Leadership					*	
F3: Competence and BPR.		*	*	*		
F4: SPI objectives and goals	*					
F5: Staff Involvement			*	*	*	
F6: Experience Staff	*	*	*	*	*	
F7: Return on investment (ROI)	*				*	*
F8: SPI awareness and	*				*	

Implementation methodology						
F9: Organizational Culture		*			*	
F10: Organizational Politics	*					*
F11: Communication and Collaboration			*	*	*	
F12: Wide Commitment		*	*	*	*	
F13 : Resistance		*	*	*	*	
F14: Allocation of Resources	*		*			*
F15: Training and mentoring		*	*	*	*	
F16: Sustainability	*					*
F17: Ease to use					*	*
F18: Minimal customization					*	

Table [5] Critical Success implementation factors belong to the Post-Construction Deployment Activities.

Table [5] shows the Matrix of Eighteen (18) Critical Success implementation factors belong to the post-Construction Deployment Activities in IS Development Projects.

A1: Security policy activity
A2: Installation Activity
A3: Integration activity
A4: Testing activity
A5: Implementation activity
A6: Documentation activity

For example, from the pervious table [5] it is found that the factor F6: Experience staff affects most of the post-construction activities (A1: security, A2: installation, A3: integration, A4: testing, and A5: implementation). And also it is found that F1: Senior management commitment affects implementation activity A5, and documentation activity A6.

6. Critical Success implementation factors belong to the Closing Post-Construction Activities.

Matrix of Eighteen (18) Critical Success implementation factors belong to the closing Post-Construction activities in IS Development Projects.

CSF / Activity	A7	A8	A9	A 10	A 11	A 12
F1: Senior management Commitment	*				*	
F2: Leadership	*				*	
F3: Competence and BPR.		*			*	
F4: SPI objectives and goals					*	*
F5: Staff Involvement			*	*	*	
F6: Experience Staff	*	*	*	*	*	*
F7: Return on investment (ROI)	*	*			*	
F8: SPI awareness and Implementation methodology		*			*	*
F9: Organizational Culture				*	*	*
F10: Organizational Politics				*	*	*
F11: Communication and			*	*	*	
Collaboration						
F12: Wide Commitment					*	*
F13 : Resistance			*	*	*	*
F14: Allocation of Resources	*	*			*	
F15: Training and mentoring	*		*		*	
F16: Sustainability	*			*	*	
F17: Ease to use				*	*	*
F18: Minimal customization	*	*	*		*	*

Table [6] Critical Success implementation factors belong to the Post-Construction Deployment Activities.

Table [6] shows the Matrix of Eighteen (18) Critical Success implementation factors belonging to the closing Post-Construction Activities in IS Development Projects.

A7: Contract management activity (Post-construction tasks)
A8: Risk Management activity
A9: Training and Support activity
A10: Delivery Activity
A11: Maintenance activity
A12: Disposition activity

For example, from the pervious table [6] it is found that the maintenance activity (A11) affects all Critical Success Factors, and factor Experience Staff (F6) also affect all closing post-construction activities.

7. Conclusion

Egypt's expenditure on IS projects and other enterprise systems is growing, and these systems can undoubtedly deliver benefits to the organizations in the developing countries [34]. However, high failure rates continue to block the delivery of such benefits. Researches to date focus only on some aspects of system outcome and/or focus only on certain specific implementation factors.

Twelve (12) IS post-Construction activities and Eighteen (18) Critical Success implementation factors were identified into four categories (Management, Project, Organization and System) and our main concern while performing this study was to collect the factors that could be more beneficial to a developing country setting like Egypt.

So a governance model for IS development projects implementation was developed and tested, by governance of Post-Construction activities in IS development Projects.

This research focuses on IS development Software success implementation. So we a model that investigates the pervious point in literature and Egyptian culture of organization was developed and tested.

8. Future Work:

In terms of future research, due to the limited number of existing models for IS projects implementation, more research is still needed to investigate the correlation between the Critical Success Factors (CSFs) for IS projects

systems and the failure or success of the IS projects implementation

Also, a governance framework to apply the pervious activities and CSF on the Egyptian environment needs to be built and investigated to support the success of IS development projects.

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