E-government Projects–Importance of Post Completion Audits

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ABSTRACT

Post Completion Audits (PCA) highlights the extent of attainment of the objectives, observations, findings, shortcomings and areas of improvement and thereby brings a balance between learning and advisory recommendations for corrective measures to achieve expected e-government Project results. The paper identifies that the internal reviews based on Project objectives may be biased and may not be adequate; the learning's may not be documented to improve the planning and execution of forthcoming E-Government Projects. PCA when used along with agile development methods for e-governance Projects can reduce risks of failures. The paper mentions skills required by the team conducting the PCA.

1. Introduction

In E-Government Projects, development and implementation process should be audited at the end of the Project, based on the KPIs as defined in the administrative sanction. The processes must be reviewed against KPIs, where the administrative objectives may be or may not be achieved. The PCA documentation should also facilitate the Organizations to undertake the Projects as and when demand arises which may be due to technological advancements or new change requests of users. This paper examines the Post Completion Audit for the IT Projects in the Government and suggests the scope for PCA to be taken up.

E-government is the governance over information technology and its processes with the business goal of adding value, while balancing risk versus return as per COBIT[1] guidelines. Government and governance are both about getting the consent and co-operation of the governed. But whereas government is the formal apparatus for this objective, governance is the outcome as experienced by those on the receiving end [2]. The terms "e-Government" and "e-Governance" are invariably used interchangeably. The Authors feel that in the Indian context e-government many a times is taken as a subset of e-governance

The Systems approach emphasizes on feedback mechanism for Organizations to be Dynamic, which implies that the learning will be from the existing systems and processes. The learning curve approach

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shows the Maturity of the Organization in the specified area. The E-Government Institution [3] defined E-Government maturity Model. Based on the Key parameters, the maturity can be measured. Generally, e-Governance Mission focuses on building a citizen centric, development oriented information society, where everyone can create, access, utilize, share information and knowledge. This leads to empowerment, enabling individuals, citizen communities thereby achieving sustainable improvement in the quality of life. The e-Governance indicators [4] defined in Andhra Pradesh IT Policy document are: i) Growth of the IT industry, ii) Growth of Employment avenues, iii) Growth rate of Investment, iv) Quality of service in all spheres

E-Government ensures delivery of information to the business that addresses the required Information Criteria and is measured by Key Goal Indicators (KGI), also considers Critical Success Factors (CSF) that leverages all IT Resources and is measured by Key Performance Indicators (KPI). The various attributes that compliment the success of an E-Government or E-governance Project is given below:

Table 1: Attributes that compliment the success of an E-Government

Attributes	Control Parameters	Desired Results
Key Goal Indicators (KGI)	Project Monitoring : Check the Quality services Standardization of the process/ products/ services Documented Business Plan	Achieving the goals & Enhanced performance & cost management. Improved Services Increased quality, innovation and risk management. Standardized business process Benchmarking for IT governance maturity
Critical Success Factors (CSF)	Define and document needs with unambiguous accountability. Strategic Initiatives, Adopting appropriate technology Documents the results of success or failure or lessons learned	Effectiveness Efficiency Confidentiality Integrity Availability Compliance Reliability in using Resources.
Key Performance Indicators (KPI)	Review the Current levels, achieved levels with target levels and control the Variation towards the target.	IT action plans for process improvement Utilization of IT infrastructure Availability of knowledge and information for managing the enterprise Linkage between IT and Governance and Improved staff productivity and morale.

2. Does IT Projects Require Audit?

Audit is a specific process in the Corporate or Government sector. Audit is an independent process, to be conducted by a person not associated with the project. The E-Government Projects are initiated with very good vision, but most of the Projects have failed at the implementation stage, because previous learning are neither documented nor considered. The Projects are reviewed with the objectives, but the Project progress facts are concealed leading to wrong direction for the Project. The post Project completion reviews may not examine Project deviations and may not understand the ground realities, issues (facts) and the same may not be documented. The Project team, who may not be willing to admit the mistakes or deviations and record the same, reviews the Projects. The situation and the factors why Audit is required are examined here under:

Top Management Commitment
Any Project will be influenced by the organization structure, culture, and systems. The Project completion is dependent on the Project sponsor, the Head of the Department (HoD) in the case of Government Projects.

The priority will change as the Government change. Most of the Projects are half completed and shelved as and when there is a change of HOD, which is a known fact.

Un-realistic Project schedules
In most of the cases, administration admits the ambitious schedules of the Government, making Project proposals with un-believable Project schedules. The non-realistic schedules will keep pressure on the Project Team. At the inception of the Project itself, the Project team believes that the project cannot be completed within schedule and never focus on the Project schedule.

Fresh Project managers
IT Project managers are a scare resource within the Government departments, e-Governance initiatives in the last decade are testimonial of this fact. Officials who are new to the IT environment and may not be able to understand the SDLC, Scope Creep and Change Management monitor the Projects. According to Jurison[5] the purpose of Project control is: "to keep the Project on course and as close to the plan as possible in terms of time and budget, identify problems before they happen and to implement recovery plans before unrecoverable damage is done". To address these issues Government of AP introduced the concept of CIO training program, a six months full time course for officials to facilitate comprehension of IT process and procedures in the year 2000.

Standardization
The applications developed or infrastructures built are based on the needs in the Government. The solution may address specific objectives and creates information islands, which may not be compatible, and leads to islands of isolated heterogeneous environment. Standardization of Data elements, Process objectives can improve services, Enhance Citizen Participation, Citizen Input / feed back, Economic development, Increase operational efficiencies & productivity, Improve process cycle & staff morale.

The recommendations issued by National Knowledge Commission of India [6] or the standards being developed for e-governance mainly focus on technical aspects, which is very important. But at the same time, we should also notice that the fundamental issues like 'User Centered Design (UCD) and Usability' are not covered adequately. The quality standards for e-governance cover limited aspects like documentation, interoperability, network, information security, metadata, localization, etc. Accessibility of e-government services is considered only from the connectivity point of view. In this context what Shneiderman [2000][7] categorically points out is very relevant- accessibility and standards are not sufficient to ensure successful usage. The usability survey on India's state government web portals [2006][8] reveals several design deficiencies and lack of technical maturity.

Attack the technology with out proper testing or understanding
In most of the cases the newer technology entering the market is experimented with, even before the new technology attain its maturity. Finger print biometric based attendance introduced failed because the technology was not tested for the targeted age groups (children). The Project sponsors must take the stock of the technologies, implementation issues and success rate. Proof of concept of implementation (POCI) is the best model or even a pilot implementation at field level will yield results.

External consultants – biased recommendations - Process Differences
Most of cases, lack of internal expertise make the Government Departments to be dependent on the external consultants for executing mega Projects. There is a chance that consultants may collude with the suppliers and the specifications are biased and may result in a proprietary solutions or a lack of competition.

Excess Business Process Re-Engineering (BPR)

BPR should change the exiting functionality to an optimal level only. A set of metrics to control, monitor BPR for e-Government implementation Projects is required in order to help Project managers / Project Directors to achieve success. According to Guha et al.[9] "Although there is the recognition of the needs to control and monitor a redesigned process and link it to continuous improvement programs, many methods studied did not reflect the recognition of these needs". The use of BPR at the local authority level referring to the level of re-engineering to be undertaken, with the suitability of processes undergoing re-engineering[10] and the level of dependence on Information & Communication Technology (ICT) needs focus.

Scope creep

The Project sponsor's objective and belief is to complete the Project to get the functionality. However during the development stage the new ideas and fringe benefits will add additional functionality. The sponsor's vision of final functionality may be doubled as the Project progress. During the reviews the team feels that the added functionality is required and never documented and the Project may never completed. There may be scope control & Change Management procedures to make the project a success.

Change by itself is not the problem as the world is always changing. It always has been changing and will always be changing. Businesses and the processes they use have always had to adapt to this changing world. Often changes in the past have occurred incrementally. When a radical change took place, the next change [11] event was slow in coming. Radical *nonlinear changes* occur in the normal course of business. Change & configuration Management procedures are essential to make the project a success.
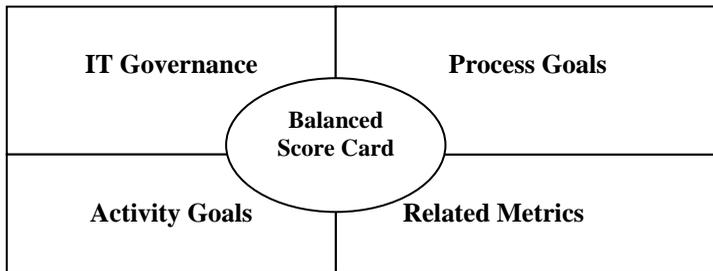
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Figure 1: Audit & controls

3.9 Short term goals - Agile Project methods

E-Governance Project implementation is a problem due to inadequate system requirements (clarity), scope creep and timelines set for launching the project. High priority Projects include, Projects based on formal or semiformal Project management methods viz., Prince2, PMI's PMBOK[12], or processes based on the Software Engineering Institute's Capability Maturity Model[13] (SEI CMM). These methods are traditionally associated with organizations that operate in software engineering centric business domains. These domains view software activities as an engineering process, rather than a creative process based on the skills of individuals or small teams and same is a lacuna is existent in Government IT Project.

Under such circumstances the model of development for e-Governance Projects in Government may be Agile Development Modes. Agile process should only be undertaken by organizations that are risk aware if not risk adverse. Organizations need solutions that can be implemented with little risk should stay clear of the Agile Processes. The agile processes include three major attributes, they are:
- Incremental and Evolutionary – allowing adaptation to both internal & external events

- Modular and Lean – allowing components of the process to come and go depending on specific needs if the participants and stakeholders.
- Time Based – built on iterative and concurrent work cycles, which contain feedback loops and progress checkpoints.

Agile Project management methodologies used to develop, deploy, or acquire information technology systems have begun to enter the vocabulary of modern organizations. Scott Ambler's Agile Modeling[14] framework – which provides a broad framework for creating agile processes applied to software Projects. While agile software development may seem straightforward at first, the transition period can be particularly challenging, which needs to be addressed appropriately.

3.10 Financial Models of IT Projects in Government
The objectives of IT Project in Government is to meet the Social needs or for improving internal efficiency. IT Project requires budgetary support for Capital, Operational, and Recurring costs. Government to Citizen (G2C), Government to Business (G2B), Government to Government (G2G) projects requires high availability of services. To make operational these services with the required level of uptime / Performance indicators, most of the Projects are outsourced under Public Private Partnership (PPP). The govt. department may choose from models like; 1. BOO – Build Own and Operate 2. BOOT - Build Own Operate and Transfer 3. BOMT - Build Own Maintain and Transfer 4. Own the infrastructure and have Service License Agreement (SLA) for Facility Management. 5. Out Source the entire Operations.

3.11 Institutional Strengthening & Capacity Building:
The Gaps in government department capacity to undertake IT projects and weak organization structure are some of the major challenges of e-Governance projects in India. PwC in its report to Govt. Of India after assessment has identified and addressing these capacity gaps through various options, such as Training Needs Assessment (TNA), Human Resource Development (HRD), Institutional Strengthening, Strategic sourcing and Outsourcing etc.

3.12 Val IT Principles for IT enabled projects
The Val IT Principles[15] are:(i) IT-enabled investments will be managed as a portfolio of investments. (ii) IT-enabled investments will include the full scope of activities that are required to achieve business value. (iii) IT-enabled investments will be managed through their full economic life cycle. (iv) Value delivery practices will recognize that there are different categories of investments that will be evaluated and managed differently. (v) Value delivery practices will define and monitor key metrics and will respond quickly to any changes or deviations. (vi) Value delivery practices will engage all stakeholders and assign appropriate accountability for the delivery of capabilities and the realization of business benefits. (vii) Value delivery practices will be continually monitored, evaluated and improved.

4. Post Completion Audits
'Audit' is generally defined as 'an examination of documents and results to find out whether they are in the desired order'. Thus the PCA is an attempt at assessing the actual profile of the given Project in terms of results vis-à-vis the intended profile besides focusing on whatever matters the Project sponsors desires. Post completion audit definitions and meanings as per different authors: Murdick and Deming: "It is a check on whether the planned benefits are being realized after the Project has been operating for some period of time". Kohler: "It is an audit at some point after the occurrence of a transaction or a group of transactions." Donald Istvan: "It is a study made to ascertain the actual performance results, to compare those results with those predicted in the proposal, and to take action regarding any differences between the two."

The major objectives of PCA are: 1.At first as an important financial control mechanism to provide a means of evaluating; (1) the financial and non-financial impact of the Project whether positive or negative; (2) how the actual results of the Project compare to data and assumption in the Project approval; (3) future actions that are necessary or expected regarding the Project. 2.Second objective is to provide information for future expenditure decisions. 3. Third objective is to remove certain psychological and / or political impediments usually associated with asset control and abandonment. 4. The fourth objective of PCA is to have a psychological impact on the individuals proposing capital investments.

Audit is a review process. Audits can be classified in many ways depending upon the purpose, accountability, domain area and others. Post completion audit is conducted at the will of the company. It is chiefly internal audit, but it goes beyond comparison of actuals against laid down rules. Audits are classified into two groups on the basis of the purpose: Propriety audit and Efficiency audit.

Propriety Audit: Propriety Audit aims at checking the appropriateness of any action and decision linking with the objective. The purpose of a propriety audit is to find out the root causes of deviation so that those factors can be managed better in the future.

Efficiency audit: Efficiency audit on the other hand, is more focused and narrow in its purpose. It involves mere comparison of actual with targets. Targets are not questioned. Efficiency audit can be conducted by middle level personnel, but propriety audit can be effective only if it is conducted by senior and well informed personnel with an open mind and analytical ability. The propriety auditor however may begin with a broad based efficiency audit for identifying the exceptional areas where he will be required to probe the propriety.

4.1 Difference between Project Control to PCA
PCA essentially involves the comparison of actual with the Projected data. Therefore, people often tend to confuse the PCA with Project control. Though there are some similarities between the two, both have some distinct differences:

Project Control: Project control refers to the periodic comparison of the expected and actual expenditure before the completion of the Project, aims at checking whether the Project in question remains within acceptable limits. Is more of a routine activity alongside the progress on the Project, and hence it normally involves the lower level of management. It is an efficiency audit

Post Completion Audit: PCA is usually conducted after the Project is completed. Mainly aims at improving the effectiveness the next time a new Project is undertaken. Is not a routine activity and is specific to the Project and subject to the scope specified by the top management. It generally involves the higher management. Involves the propriety audit, thus goes beyond the comparison of actual and target data, and questions the propriety of various policy decisions and checks the MIS, while conducting PCA each policy assumption and activity outcome under the microscope.

4.2 Benefits of PCA
It should be ensured that people do not consider the PCA as the process for initiating punitive actions, otherwise this will discourage initiative and lead to excessive conservatism and may cause managers to suppress risks Projects. The PCA should remain educational in nature and purpose is documenting the mistakes for future reference.
- Provide a check on personal biases, Improves the quality of estimates, Improves the productivity, as estimates become goals.
- Identifies factors due to which Projects are not fulfilling their expected promises.

- Provides information for subsequent decision-making and can be used for corrective action is estimates were ever poor, Gives a sense of Project evolvement form the original objectives to final objectives
- Learning lessons for the future rather than simply faultfinding or fixing blames.
- Precautionary care should be taken to avoid misplaced perceptions about the PCA.

From a strategic viewpoint the authors strongly recommend the adoption of a Balanced Score Card Approach [16] as a possible measurement metrics as depicted in the figure below.
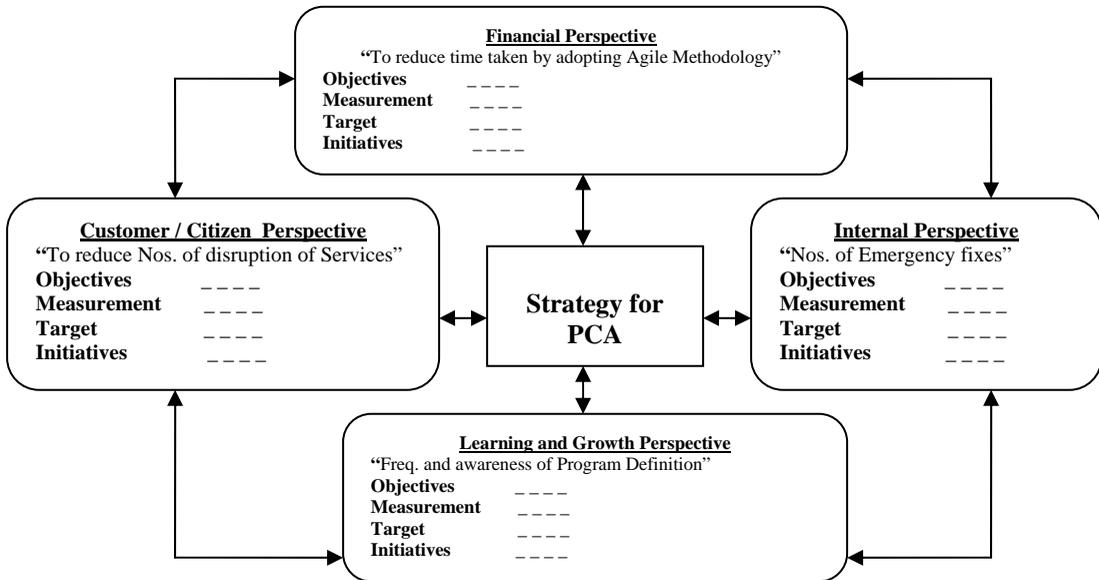

Figure 2: Impact of PCA – A Balanced Score Card Approach

4.3 Design of a PCA System
PCA is always Project specific, whether it is an infrastructure or development or any Project involves managerial decisions:

The findings of the PCA would be valuable asset to the Organization as well as to the external stakeholders. However, while sharing the information to the external world, the findings needs to be examined by the Top Management, since sharing of certain information to the external world would be sensitive decisions. It is not necessary that the findings of the PCA be shared with all concerned parties.

4.4 Post completion audit procedures
The auditor of the completed Projects has to be very careful in carrying out the audit. He must follow some procedure so that full justice is done to the work. Some points related to the PCA procedure are described below:

Table 2: Design of PCA –parameters

Parameters - PCA Design	Authors Recommendation	Benefits that can accrue
When to design the PCA?	For best results at detailed project report (DPR) stage	Auditor to assess whether variances have resulted from controllable factors or non-controllable ones.
Whether to conduct the PCA?	When there is scope for learning Similar Project is unlikely to be taken up again Large Project influence a large portion of population	Learning's Large population may get benefit
Who should Audit	IS certified auditor to have the desired results?	Certified person from a body, adopt the ethics & principals.
When to Audit	On project completion When Project is suspended	Improvement of future projects To continue or to discard abandon a suspended project.
What to Audit	Cost controls Time management Final deliverables (All assets/ Services)	Fulfillment of Goals, objectives & vision (usability of deliverables) Failure of controls or effectiveness of controls

Collection of appropriate information: The starting point for collecting post audit information is the Project completion report and other Project Deliverables System Requirement Specifications, System Design Document, Test Cases, User Manual etc. Post completion audits genially compare the projected data with the accounting data collected.

Comparison of Projected parameters with actual: This is the next important step in the post completion audit procedure. There are many techniques available for the comparison of actual with the projected parameters. The comparison is the starting point from which the real audit begins. Only comparable data is compared. Multiple methods may be applied for comparison if there is such a requirement. Comparison is a step-by-step approach so that causes are identified systematically with minimum cost, time and energy.

Establish the possible causes of variance: Once the variance/ deviations are identified, if they are significant the possible causes for the same are explored. An auditor goes by exceptions and from there he tries to reach the root causes of deviations. This process of investigation can be effective only if the auditor possesses skills of inquisitiveness and skills of persuasion and negotiation. A summary report of the PCA findings should also be prepared by the auditor.

Once the causes are ascertained the Post Completion Auditor can give his recommendations based on which the manager may take decisions for cash flow forecasting to reinvest or abandon the ongoing Project. After the PCA the prediction and Project evaluation become more accurate for the forthcoming Projects.

5. Suggested Scope (Coverage) for PCA
The suggested scope for covering all IT Projects, PCA has to select the relevant areas for the specific Projects. The Auditor may select areas of his concerned as per the stakeholders objective, shown in Table 3.

Previous Audit Cases
As per the report on "Auditing e-Government" prepared by the INTOSAI[17] Standing Committee on IT Audit, the definition of e-government :*"E-Government is the online exchange of government information with, and the delivery of services to, citizens, businesses and other government.*

Table 3: Coverage of PCA

Primary Focus Areas	What are the priority sectors of the Government – are they are covered What are the opportunities and Objectives What is the long terms Plan (Vision) for the next few years Cost of Capital (Manage the Information Technology Investment)	
Secondary Focus Areas	Technology	Define a strategic IT Plan, Define the Information Architecture, Determine Technological Direction, Is the technology used for the Project relevant, Justification for foreign tie-ups, technical know-how, Does the technology evaluated in the right context, and in the right environmental considerations
	Risk & Control	Assess Risks & Risk Analysis Control - Financial & Process control
	Project Management	Operations, Resources, Manage Human Resources Time & Cost
	Compliance	Internal - Quality, Identification Solutions, Develop and Maintain Procedures, Install and Accredit Systems, Manage Change, Define and Manage Service Levels, Manage Third-Party Services, Manage Performance and Capacity External – Legal & Statutory

Table 4: Few e-Government cases where Audits were undertaken

Project Name	Identification / corrective measures post Audit undertaken	Stakeholder participation as per Balanced Score Card
e-Seva – Andhra Pradesh	i) Security for transmitting data over Internet ii) Rectification and validation of S/W	Limited to Financial and Internal Perspective
EDI System – Customs Dept. GOI	Imprudent selection of connectivity solution led to wasteful expenditure of Rs. 10.3 Million	-do-
250 Bed Public Hospital in Maharashtra	Lack of ownership in Phase I → Corrective measures in phase II → Ownership Accountability, Change Management, BPR in Phase II	Limited to Financial, Internal, Customer (partial) perspective

The authors strongly feel that Audit should encompass a 360^0 coverage to ensure Balanced Scorecard Model usability as performance measure, to capitalize on the learning perspective[18].
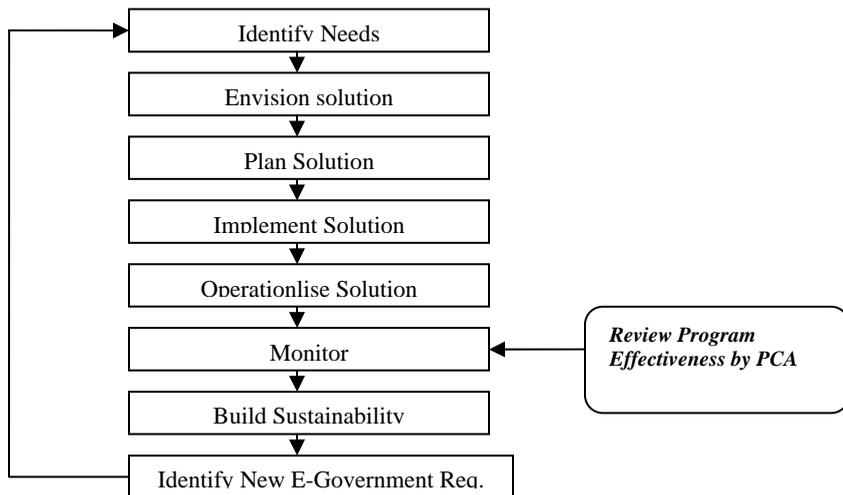

Figure 3: Importance of Audit

6. Concluding Remarks

The purpose of Post completion audit is to find out the root causes of deviations or changes or shortfalls in the final deliverables (Objectives), so that those factors can be managed better in the future e-governance projects. PCA suggests for improvements in future estimates, planning, and deciding the objectives & goals effectively. Most of the e-Governance project reviews are conducted by the Senior officers and occasionally by the sponsors. The review findings may not be recorded or documented, as issues or problems, which may attract the Financial Audit objections or criticism at a later date. Since, the facts are not recorded for corrective measures, the same may not be considered for the benefit of future Projects. Where as an independent IS auditor, one who can give balanced opinion for corrective measures and try to advise on the process / activities how they could have been, to yield best results. The PCA can result in: A sense of Project evolvement form the original objectives to final objectives. Identifies factors due to which Projects are not fulfilling their expected promises. Provides information for subsequent decision-making and can be used for corrective action in estimates. Improvements in the quality of estimates, productivity, definition of objectives for future projects. Legitimacy to the PCA may remove some of the possible barriers to the learning process usually experienced in a corporate life and in e-governance. A learning organization will have fewer political processes in it. Objectivity and transparency brought by a legitimate PCA would impair the political processes and make them ineffective. It is recommended to have PCA with clear perceptive in Government with a certified IS Auditor for unbiased report. The process of PCA should remain as an educational process in nature. The purpose of PCA is to document the mistakes for future reference. The authors strongly recommend PCA for all critical e-Governance Projects for the benefit of the nation.

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