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# A Comparative Review of Information Technology Project Management in Private and Public Sector Organizations

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**[Abstract]** Both private and public sector organizations tend to recognize the prominence of information technology within project management techniques and practices. The primary objective of this paper is to present a comparative review of information technology within project management in private and public sectors. Moreover, this research provides an extensive review of related topics such as the evolution of information technology, factors contributing to project abandonment, and the tools and techniques of management that effect project success. In conclusion, the authors present a variety of practical and effective guidelines and recommend approaches for the successful deployment of information technology within project management for both private and public sectors.

**[Keywords]** information technology; project management; private and public sector organizations

## Introduction

The use of Information Technology (IT) has augmented the field of Project Management (PM) by providing a significant set of tools and techniques to even accelerate the efficiency and effectiveness of projects within private and public sector organizations. Furthermore, as IT becomes increasingly more prominent globally and across all types of organizations, it becomes critically more important to comprehend a variety of managerial techniques and "best business practices" to ultimately contribute to the success of operational practices (Rosacker & Rosacker, 2010).

A basic survey shows topics of Information Technology related to Project Management covering a significant volume of Project Management literature (Urli & Urli, 2000, Kloppenborg & Opfer, 2002; Rivard & Dupre, 2009; Peslk, 2012). Of significant importance is a review by Urli and Urli analyzing over 3,500 articles published under the auspices of project management studies, revealing that 63% of these articles reported on information systems projects, while 24% dealt with research and development (R&D) projects, and just 13% were aimed specifically at construction projects. Furthermore Kloppenborg and Opfer, after 40 years of research on project management, observed that information systems have been one of the central areas of project management. Generally, a significant portion of the project management deals with management of information systems from industrial to government sectors, but particularly within the software industry. Rivard and Dupre conducted an extensive search of articles published for decades in Information Systems Project Management. Furthermore, researchers reported ten topics encompassing IT project management, including Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk and Procurement.

Numerous similar empirical research reviews have been conducted in the separate fields of information technology, project management, and private and public sector organization management; however, there has not been a cohesive, comprehensive and comparative review that considers all these interrelated fields. Consequently, the primary goal of this paper is to present a comparative review of Information Technology within Project Management in private and public sector organizations.

The authors briefly provide and utilize the following working terminologies within this paper: (i) Project Management - "Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements." (Project Management Institute, 2008, P.6); and (ii) Best Business Practices - The concept of "best business practices" according to (Rosacker and Rosacker, 2010) "encompasses the application of proven methods and techniques to address business situations in a directed manner, thereby enhancing the opportunity of success."

## Evolution of IT in Organizations

Briefly exploring the evolution of IT resources will be helpful in understanding IT project management practices in private and public sector organizations. IT resources were initially utilized for basic transaction processing, using mainframe computers with large disk drives, reel tapes, and line printers. These huge systems provided services for massive daily operations and produced static reports for management with limited access to the hardware and software (Schelin, 2003). The next generation of computing (from the late 1970s and early 1980s), with the advent of personal computers, gave birth to distributive processing and development of productivity software such as Lotus 1-2-3, WordPerfect, Varieties of Databases. In the 1990s, the Internet revolutionized the field of IT by introducing communication tools such as E-mail, the World Wide Web, and file transfer tools (Melitski, 2003). More sophisticated hardware and software continued to advance IT in the 2000s, especially technology such as Cloud Computing, Enterprise Resource Planning (ERP), Application Service Provider (ASP), and Human Resource Management Systems (HRMS). Considering these recent advances in the computing field, IT became a valued, integral part of nearly all organizations and a particularly strong ally to management (Rosacker & Rosacker, 2010; Anwar & Mohsin, 2011).

Ultimately, IT resources have become one of the main assets in private and public organizations, and as these tools grow more ubiquitous, the understanding and utilization of IT resources gradually is becoming more prominent in the public sector, closing a gap that has existed for decades (Yildiz, 2007).

### IT Project Management within Private and Public Sectors

Information Technology is widely utilized in private as well as public sector organizations, as evidenced by a great margin of financial resources allocated to IT (Grimsley, Meehan &Tan, 2007; Gross 2009; Project Management Institute, 2013). However, a majority of IT projects in both sectors are mismanaged and basically inefficient in accomplishing the scheduled and strategic objectives and goals (Powner, 2008).

Rosacker and Rosacker (2010) conjectured that there was a marked difference between Information Technology in the private sector versus the public sector. The researchers divided their investigation into three phases: The first phase was a review of the evolution of Information Technology used in government organizations, in particular, the United States government; the second phase was to determine the differences between public and private sector organizations; and finally, the last phase of the study was to investigate and report on research that had identified the unique attributes of public sector information technology. The findings of the study were that a large majority of the public sector IT projects suffered from being over-budget, falling beyond their implementation time, and failing to produce the "functional requirements" when they reached their completion. The authors suggested future empirical studies to determine best practices for public sector IT projects; they recommended studies include cultural and organizational problems unique to the public sector and focus on successful public sector projects in order to identify successful practices.

Project management frameworks, guidelines and techniques that have been developed in the private sector cannot be directly used in the public sector without empirically studying the similarity and differences between them (Cats-Baril & Thompson, 1995). Further, Rosacker and Risacker (2010) report that while the private and public sectors are similar in some aspects, they differ in at least in several ways: (a) the private sector deals closely and intensively with competitors, and the public sector does not share the same pressure in competition; (b) The accountability of private sector managers are to immediate clients, shareholders, and stakeholders, in contrast, public sector managers are accountable to a broader group of constituents (also Cats-Baril & Thompson); and (c) Public organizations can be subject to more strenuous laws and regulation than private organizations.

Similarly, Bretschneider (1990) conducted a study which included over 1,000 public and private organizations and provided some potential differences between two types of organizations that could affect the success of IT projects: (a) Public and private IT managers cope differently with respect to interdependence across organizational boundaries; (b) Public and private IT managers express different criteria for the evaluation of hardware and software; (c) Planning is usually concerned with extra-organizational linkage in public sector, while internal coordination in private sector; (d) In the public

sector, IT managers are placed at a lower level of the organizational structure than private-sector IT managers.

While IT has rapidly advanced and displayed an increasingly progressive influence on project management techniques, empirical research in the area of IT project management remains insufficient; there are some anecdotal research that provide some insight, but none have been sufficient to fill the gap (Grimsley, Meehan and Tan, 2007; Melin and Axelsson, 2009). Therefore, managers—and specifically public sector managers—have made short- and long-term decisions about IT without having knowledge well-supported by empirical research. Thus, there is a great need for empirical inquiry that eventually leads to "best business practices" to be applied in private and as well as public sector organizations.

Sarantis, Smithson, Charalabidis, and Askounis (2010) described the fact that many government entities are using information technology to create e-Government projects that serve to provide the public with websites for access to services and provide accurate and up-to-date information and to improve the workplace for government workers. The authors used exploratory research methods, reviewing journals, books, and case studies along with personal experience to gain insight into the project management approaches used for these projects and the issues and gaps that have occurred as they are developed. Through their analysis, researchers identified four persistent gaps in project management: (i) Failure to determine a clear goal-driven plan for a project; (ii) Inability to structure multidimensional projects into workable phases; (iii) Lack of knowledge transfer when projects are completed; and (iv) Failure to cope with the nature of e-government stakeholders. They concluded that there is a need to reassess the structure in e-government project management.

A management system needs to be designed that considers the lifecycle of the whole project, determines the special challenges of e-Government projects, and merges hard and soft traits of project management. The authors stated the need for more in-depth studies in order to create a more successful e-government project management structure.

Although there are several business practices that may significantly improve the return on investment of IT projects, project management could reap substantial benefit through empirical research focusing on both sectors. Information technology project management practices need to be considered for a variety of reasons, including continuous changes of use of technology (Melin & Axelsson (2009). While there are a good number of studies performed on "best business practices" within the private sector, a major research gap exists for the public sector. Considering the large size of public sector agencies and large amount of IT investments by these agencies, future research seems to be crucial and necessary (Bretschneider, 1990; Cats-Baril & Thompson, 1995; Schwalbe, 2010).

Recently, and as mentioned earlier in this paper, Rosacker and Risacker (2010) conducted a major review of IT project management within public sector organizations. Their research argued that applying the lessons learned from the private sector to public organizations might be unsuitable without first empirically inspecting their applicability.

To further investigate information technology project management within private and public sector organizations, the forthcoming sections briefly provide reviews of research on the following topics: (i) Factors contributing to IT project abandonment; (ii) Project management techniques and IT project success; (iii) Maturity of IT project management; and (iv) Guidelines and approach for successful project management.

*Factors Contributing to Information Technology Project Abandonment*
IT project failure and abandonment rates have remained consistently high; Standish Group (2013) provided an in-depth study reporting that 43% of projects demonstrated issues such as being late, over-budget, or having less than the required features and functions; additionally, 18% failed due to cancellation before completion or delivery. Similarly, Keil, Mann, and Rai (2000) reported that 30-40% of IT projects exhibit some degree of escalation (escalating continued commitment to a failing course of action). The proceeding research concisely provides the primary reasons for project abandonment; however, comprehensive coverage of this topic is not within the scope of this paper.

Ewusi-Mensah and Przasnyski (1994) identified several factors causing information technology projects to be abandoned in organizations. They discovered senior management involvement and end-user participation to be the primary factors of failure in the project development process. The abandonment could be categorized of three types within the organizations; (1) Total abandonment; (2) Substantial abandonment; and (3) Partial abandonment. Researchers suggested that the three main categories which contribute to the abandonment of information technology projects are economic, technological, and organizational in nature, and the results confirmed a strong similarity to the results of their earlier study as follows: Project costs and schedule were not a major contributor to abandonment; technological issues did not significantly contribute to the decision for abandonment of projects; and finally, considering the organizational factors, management and end-users were possible major contributors to project abandonment, while the information technology personnel were not considered to be a major contributor.

Cats-Brial and Thompson (1995) conjectured four deficiencies that causes severe issues for the implementation of most IT projects; namely, failure in any or all the following: (a) assessing risk of an individual project; (b) counterbalancing risk and benefit; (c) defining different managerial approaches for each project; and (d) considering the aggregate implementation risk of projects under development.

Warkentin, Moore, Bekkering, and Johnson (2009) conducted research to determine why such a high percentage of information systems development projects fail to meet their objectives. The researchers first developed a list of the three main risk factors to systems development: technical, organizational, and resource constraints. They designed an open-ended questionnaire that was distributed to a total of eight experienced systems development engineers and project managers in different organizations. From the responses of the first questionnaire, a second questionnaire designed with thirteen questions was distributed within a specific industry to eight experienced system development personnel to obtain feedback on perceived risks in their own projects.

The results indicated that organizational risks present the most risk to the success of a project. Unless there are people dedicated to overseeing a project and the organization is committed to the "big picture" of the project and provide the necessary support to successfully complete the system development project, then the result will be failure or falling short of expectations. The researchers suggested more studies be conducted with a larger number of respondents from a greater number of organizations.

*Project Management Techniques and Information Technology Project Success*
Over the past few decades, there has been a multitude of studies on information technology and various related aspects linking information technology to effectiveness of the completed projects (Glorfeld, 1994; Peslk, 2012; Taylor, Woelfer & Artman, 2012). Moreover, there has recently been a great quantity of research dedicated to information technology project success and key project management techniques contributing to the accomplishment of projects, including requirement, risk, planning, scheduling, user involvement, management commitment, change control, management methodology, communications, alignment to strategy, and globalization (Tarnow, 2002).

Tarnow extensively investigated the twelve mentioned techniques and concluded that project success may be improved by utilizing selected project management techniques. For illustration, Tarnow showed that the following selected correlations between project management techniques and success of the projects: (a) a positive correlation between high project user involvement and high project success; (b) a positive correlation between upper management support and high project success; (c) a very positive correlation between a formal project communication method and high project success; (d) a strong positive correlation between a strong project linkage to strategy and high project success; and (e) a very strong negative correlation between project globalization and high project success.

One of the major success factors of projects seems to be the competency of the executives. Recently, a well-recognized Standish Group (2013) conducted research of success of software development projects across diverse industries that showed almost 39% of all projects were delivered on time, on budget, with planned required features and functions successfully; while 43% demonstrated issue such as being late, over budget with less than required features and functions; and 18% failed due to cancellation before completion or delivery. It must be noticed that the success rate of projects is improving due to use of well-

known factors directly quoted from the CHAOS 2013 report: "…looking at the entire project environment of processes, methods, skills, costs, tools, decisions, optimization, internal and external influences, and team chemistry." (Standish Group, 2013, p.1). Further, the CHAOS report maintains that "the single most important advancement to improve project success rates is the increase in competency of the executive sponsor." (Standish Group, 2013, .1).

Furthermore, research demonstrates that upper-level management plays an important role in project success. Lee and Anderson (2006) used a rank-order Delphi survey to determine key factors in an organization that impact information technology project management capabilities. The researchers believed there were other factors beyond the project management maturity model that have profound influence on the outcome of IT project management capabilities. In order to determine these factors, the Delphi survey was used enlisting the help of 33 panelists from a broad demographic group. The panel was comprised of individuals with less than 5 years to more than 20 years of IT industry and/or IT project management experience.

The survey was presented in 3 phases: the first, brainstorming to identify 35 influencing factors. Next came the narrowing of the list of factors from 35 to the top 13 items using a Likert scale of 1 to 5 to select these items. The third phase was to rank the top 13 in order through a face-to-face meeting. Using (W) Kendall coefficient of concordance to calculate the results, the panel was able to determine the top 4 impact factors. The results indicate that upper management plays a key role in the success of IT project management along with "a clear definition for success" presented to the team. This study provides assistance to all levels of management involved in project management within an organization.

Risk management is considered to be one of the most important instruments available to a project manager in order to insure a positive outcome for a project. Three of the main approaches most often discussed in the literature studied are the management approach, the contingency approach, and the evaluation approach (Didraga, 2013). Specifically, Didraga conducted a study to determine how risk management might affect organizations in Romania using information technology in their project management. A study and analysis of studies previously conducted then analyzed how risk management methods affect the subjective and objective functions of a project. Using articles from 1978 through 2012, Didraga prepared a questionnaire which was sent to a targeted IT managers, IT analysts, and projects managers in Romanian companies. It was determined that risk was part of software development projects and implementation projects.

The researcher expressed that in order for projects to come to a successful conclusion, processes and procedures which follow best practices are important factors of successful projects. In the event a project fails, the project should be examined and procedures and processes evaluated and changed to improve future projects. Risk management was more effective in objective performance and provided negligible influence on the subjective performance of an IT project. Researchers suggested conducting further research, including interviews and analysis of projects with successful conclusions, in order to provide more definitive findings.

*Maturity of Information Technology Project Management*
As project abandonment and failure rates are still high, organizations are searching for various approaches that may assist them with project success (Judgev & Thomas, 2002). Thus, industry practitioners have provided several Project Management Maturity Models (PMMMs) to increase the delivery of projects that are more susceptible to success. To this end, Sidenko (2006) investigated by surveying over 100 IT industry project management professionals to find out the relationship between project management maturity and project success. The study concluded that project efficiency and direct business of organizational success were the two most relevant factors contributing to the organizational project management maturity level, while preparing for the future and impact to the customer was not as relevant.

Another challenge for organizations is that budget and schedule runs—or even outright failure—of projects often results from escalating commitment to failing IT projects. To stop the escalation cycle, Flynn, Pan, Keil, and Mahring (2009) compared and developed an integrated De-escalation Management Maturity (DMM) model that studied three management approaches to determine a more suitable de-

escalation management approach for IT projects. By comparing the three approaches, Crisis Management Approach, Change Management Approach, and Problem Solving Approach, the authors suggested ways in which organizations could take the best of the three approaches and implement them into their business structure. Knowing that most businesses could not make the change immediately or might choose not to take on the total structure, the group provided levels of implementation so that a company could adopt the level that suited their needs and maturity.

*Guidelines and Approaches for Successful Project Management*
Many projects, including IT projects, have issues with being over budget, behind schedule, and ultimately with lower functionality that the planned system (Cats-Brail & Thompson, 1995; Anwar & Mohsin, 2011). As a result, a good number of techniques, guidelines and frameworks have been proposed by various groups such as academics, consultants, and practitioners to contribute to project success. For instance, Cats-Baril and Thompson have conducted an in-depth case study of the State of Vermont's Human Resources Management Systems (HRMS) to show many of the issues with public sector management of IT projects. Consequently, they have offered a remarkably successful approach. The verbatim highlight of their six steps approach is briefly listed below:

> *Step 1: Evaluate the alignment of proposed project with the mission and objectives of the organization.*
> *Step 2: Evaluate the benefits that the project will bring to the organization.*
> *Step 3: Evaluate the risk inherent in the project.*
> *Step 4: Cross-reference the expected benefits from the project to its inherent level of difficulty or risk.*
> *Step 5: Decide how to manage the project to maximize the probability of successfully implementing the project.*
> *Step 6: Decide whether or not the organization has the necessary skills and the environment is propitious for the project.*

Furthermore, Cats-Baril and Thomson provided a comprehensive lessons-learned from the State of Vermont's HRMS based on the above approach that could be utilized and considered for other public organizations and which, with additional empirical research, may also be incorporated in approaches and guidelines for private sector organizations.

As information technology is rapidly evolving, specialized software and systems directly and effectively contribute to the success of project management in both private and public sectors (Ali, Anbari & Money, 2008; Kastanoulia, Petropoulos, Litsa, Nikitas, Pagourtzi & Assimakopulos, 2011; Anwar & Mohsin, 2011). Ali, Anbari and Money realized that as project management and the nature of projects themselves had become more complex, there was a need to find new approaches to update project management capabilities using IT. Thus, software was designed to take care of the constraints of project management which do not require the quantitative skills of previous methods. The objectives of the researchers study was threefold: 1) To develop a standard of factors that project management software for this type of organization should possess, 2) to determine what influence the software would have on the project's team performance, and 3) to define how successful use of the software packages could be measured. After conducting an extensive literature research, they developed a survey using a 7-point Likert scale for the responses. Two independent samples were derived from the survey: one from an online source directed to project management professionals and educators and the other from the Project Management Institute.

The results were that system characteristics were the top factor affecting the use of software in project management. Perceived performance value was increased by 35% per unit when project management software was utilized. Also top factors were quality, system functionality and ease of use, all of which had positive and unequivocal connection to the use of project management software. The researchers indicated that additional research is needed to determine if the use of IT in project management had a direct correlation to project success and whether it affected the organization's position with similar companies.

## Conclusion

In this brief paper, authors investigated different factors of information technology effecting project management in both private and public sector organizations. Differences were explored in IT project management within private and public sectors, while factors contributing to IT projects abandonment were also presented. Later, authors provided a research review on project management techniques and information technology project success. Finally, authors offered guidelines and approaches for successful project management using a variety of management tools and techniques, including the possibility of using software to cover the lack of quantitative skills of previous methods. In conclusion, there seem to be a good number of practical and successful management tools and techniques supporting successful projects in the private sector that might also be useful for public sector; however, there is still a great need for empirical research to be conducted to investigate and validate their fits for public sector organizations.

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