Limited Use of Project Management Tools and Techniques: Determining and Evaluating the Reasons

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Abstract: In today's highly competitive environment, project management (PM) is subject to appropriate usage of project management tools and techniques (PMTT). This study presents the reasons of limited use of project management tools and techniques. Empirical evidences drawn from deductive research method have been used for formulating the appropriate reasoning. The link between the project management practice and project performance has been identified. The analysis shows evaluation of reasons of limited use of a wide variety of PMTT across varying contexts (projects, organizations, etc.). The result of the study reveals that traditional project management tools and techniques are not adequate to address the key concerns of project practitioners facing today because they are working in an environment where uncertainty, technological advances and corporate re-engineering are taking place at fast pace. Moreover, customer satisfaction, complexity management, accelerating schedule, contract management and risk management are among the key issues. Working effectively in this environment necessitating employing and improving use of PMTT along with enhanced skill levels of project managers to survive and thrive. Project management practice is a strategic asset to organizations and should be built though integrating appropriate PM tools and techniques into practice. These tools and techniques should be compatible to the project context.
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1. Introduction

Project management (hence forth called PM) is currently considered as managerial tool that helps organizations to attain business objectives. According to Cleland, (1998), an organization with the help of project management may, manage its scarce resources, reduce product development time, deal with technological complexity, take care of stakeholder satisfaction and compete in global market.

Much work has been done relating to PM over the past two decades and researchers and practitioners strived to investigate reasons of project failures and factors responsible for success (Karen et al., 2010). There are five main processes take place in projects management comprising a) initiation; b) planning; c) execution; d) monitoring and control process and e) closing process.

A range of project management tools and techniques (hence forth called PMTT) are used in projects to plan and control scope of work involved delivering a product up to satisfactory level. Just like other professions, project managers use certain PMTT for making their PM activities easier (Andongndou et al., 2009). Every project has different objectives but same tools and techniques of PM are applied to these projects for their management, scheduling and control irrespective of its type may it be a construction, manufacturing (Ahuja et al., 1994). Thus, the effective implementation and execution of projects substantiates the importance of project management methodology (PMM). Broadly, PMM incorporates a range of knowledge areas and a set of tools and techniques which help and manage all components of the project (Milosevic and Patanakul, 2005).

Hence Chin and Spowage (2010) states that methodology should be adaptable to scale of the project. PMM is employed in all project phases such as planning, coordination, conceptualization and closing in order to meet the stakeholder's requirements to complete the project within budget and on time. However, to seek effectiveness of the existing methodologies in the market, understanding of their requirement and characteristics is must. The effective methodology is the one that can be adaptable to the specific project environment, works well in the vibrant nature of projects and responsive to stakeholders demands (Murch, 2001).

There are numerous institutions around the world called bodies of knowledge involved in development and promotion of project management and produced project management recognized published standards. The Project Management Body of Knowledge (PMBOK) comprising project management skills, tools and techniques, has been

developed by Project Management Institute (PMI) over past 50 years. Project managers apply these generally accepted published standards to manage their projects. However the question regarding the extent of their usage and impact of project performance is still needed to be answered (Thomas and Mullaly, 2007). However, many researchers commented that benefits retrieved from the use of PMTT may include better resource control (financial and human), increased customer service, minimized costs, improved quality, better profitability and productivity, better internal control and better job satisfaction(Furumo et al., 2006). Sdrolias et al. (2005) stated that implementation of PMTT brings cost reduction.

This paper observes project management practices in context of use of project management tools and techniques. The aim of research is to examine present use of tools and techniques by practitioners and further exploring and identifying which PMTT are in limited use. Limitations of selected PMTT have been explored in detail in order to identify and evaluate reasons of limited use of these tools and techniques. The objective of this research is to investigate the following research questions:

i) What are the limitations of project management tools and techniques (PMTT);

ii) What is the extent of use of different PMTT?

iii) How PMTT are in limited use and what are the reasons in varying contexts (project types, sizes, organizations);

iv) How appropriately PMTT can be used leading to project success?

v) What is the impact of use of project management tools and techniques across project life cycle; and

vi) What basis project managers should select PMTT?

The secondary research using deductive research method is conducted and carries generalization aspect. A systematic literature review is done relating to empirical studies on use of PMTT and indicates issues further to be investigated in this field. The research mostly comprehends current developments around research questions and limited to the literature reviewed to identify and evaluate the limited use of PMTT.

The results of research would add value to the applied field of project management through providing insights into the current state of the field which would be helpful in future developments in this area would further extend help and guidance to practitioners and organizations in selecting appropriate tools and techniques. The study divides in to following sections: after introduction which is presented in Section 1 above, Section 2 carries extensive literature review on effective usage of project management tools and techniques. Results and discussions are presented in Section 3. Final section concludes the study.

2. Literature Review

In today's competitive environment implementation of project management is of paramount importance as project management is to deal successfully with increasing challenges of project complexity, customer requirements and risks, etc. (Murphy and Ledwith, 2006). Munns and Bjeirmi (1996) states successful implementation of project management may increase the chances of project success. Project management practice is a strategic asset to organizations and should be building though integrating PM tools and techniques into practice (Besner and Hobbs, 2006).

PM practices can be investigated well by examining tools and techniques because these can be measured. Project managers use them to track project success dimensions i.e. cost, time, quality, performance and satisfaction, etc. Milosevic and Ozbay (2001) states by using project management tools and techniques by organizations aligned with their project contexts, potential to deliver the project successfully increases.

Milosevic (2003) suggested a model in which strategic project management of an organization is based on its PM toolbox. According to that both organization’s strategy and project’s context are compatible with its PM toolbox comprising selected tools and techniques.

Project management is a well-developed field provides a significant description of tools and techniques that are employed in project management processes (defining, planning and implementing) (Murphy and Ledwith, 2006). One can analyze project information in very convenient and organized way with the help of these tools and techniques. Knowledge about advantages and limitations of each tool and technique is very critical for better performance along with project management processes (Andongndou et al., 2009). Formal PM Practices are currently being used but are not being implemented equally in all knowledge areas (Karen et al., 2010).

The literature directs on how PMTT are actually used out of several available PMTT. Thamhain (1999) conducted a study on project managers’ awareness about how to use PMTT and found that project managers used only 28% of PMTT given in the study and more so they had only 50% basic knowledge about use of those tools and techniques.

Similar finding was observed from a survey conducted by White and Fortune (2002).

2.1. Current State of Research on PM Practice and Use of PMTT

Though, use of project management tools and techniques does not comprehend project management practice rather it is one important measurable aspect of project management practice. Tools and techniques are the specific means through which rules and principles of PM are applied (Besner and Hobbs, 2008).

Study of project management literature reveals there is a lot of bookish knowledge available for academic and practical purposes. PMTT are mostly discussed in project management books (Patanakul et al., 2010). Some researchers define PMTT as software for project management (Fox and Murray, 2003) and others define PMTT as a systematic practice that project managers use for management of projects (Milosevic, 2003). The later definition of PMTT is considered most authentic and provides basis of this research.

2.2 PM Practice: Generic versus Contextual

According to some researchers PM is generic like Wirth (1992) argued that due to generic characteristic PM can be applied to various industries after tailoring according to the requirements. The *PMBOK® Guide* itself demonstrates the generic nature of project management and suggests adapting appropriate tools and techniques compatible with their specific projects and contexts (PMI, 2004, p. 3). The basic aim of the *PMBOK® Guide* is to provide general overview and a list of generally accepted good PM practices (skills, tools and techniques) which are well established and applied to most of the projects in most of the times (PMI, 2004, p. 3). On the contrary contextual characteristic of PM practices are being researched. Kesner and Hobbs (2004) [mentioned in Besner and Hobbs (2006)] argues the same that basic project management toolbox can be applied to almost all projects in almost all contexts. According to Shenhar (1998) significantly different PM practices are applied on different type of projects. Subsequent discussion would lead to determine importance of use PMTT for project success.

2.3 Importance of Use of PMTT

Literature establishes strong relationship between PM practice and project performance (Furumo et al., 2006; Besner and Hobbs, 2006; White and Fortune, 2002) discussed use of different PM tools, techniques and methodologies and observed considerable differences in their use. To lead projects successfully project managers should be skilled to manage project activities relating to initiating, planning, executing, monitoring and controlling and closing (PMI, 2008). Several studies suggest that success of a project influences by the proper use of project management tools and techniques (Pinto and Slevin, 1988; Cash and Fox, 1992; Hatfield, 1995; Thamhain, 1996). On the other hand, according to several researchers such as Cash and Fox, 1992; Hatfield, 1995; Thamhain, 1996; Kerzner, 2000 failure of the project may be caused by the improper use of project management tools and techniques.

2.4 Reasons of Limited Use of PMTT in Various Contexts

The available literature sheds light on the use of specific tools and techniques, but unable to empirically substantiate the use of PMTT for project success (Patanakul et al., 2010). To address this issue Patanakul et al. (2010) investigated empirically the use of PMTT across the specific phases of a project life cycle, their impact on the success of a project. The results indicate that there are several PMTT being employed in a specific project phase but few of them contribute in the success of a project.

According to Gray and Larson (2008), project life cycle is comprised of four distinct phases named a) conceptual, b) planning, c) execution and d) termination and controlling each phase effectively is pertinent to obtain project objectives (Patanakul et al., 2010). The uses of PMTT with respect to phases and project performance will be discussed in preceding paragraphs. Project managers use different PMTT during different project phases in order to achieve different deliverables. For example specific deliverable and most frequently tools used are as follows in Table 1.

Table 1: Project Phases and Main Deliverables

Phase	Main Deliverables	PMTT
Initiation Phase	initial scope of the project	Preliminary Scope Statement
Planning Phase	detailed project scope, schedule and budget	WBS, Hierarchical Schedule and Analogous Budget Estimation
Execution Phase	Building physical project deliverables	earned value management, cost baseline, schedule crashing
Termination Phase	Project Delivery	Lessons Learned and Performance report

Source: Patanakul et al., (2010)

Patanakul et. al., (2010) conducted the study considering three groups of variables such as PMTT, project phases and project success dimensions (Ref. Table 1). A list comprising 37 PMTT were selected from the literature, e.g. (PMI, 2000; Milosevic, 2003), with respect to frequency of their usage (rarely used and frequently used). Four groups of success measures (internal and external) derived from the stakeholder approach (Shenhar and Dvir, 2001) were used in the study. Each group with respect to success measures is stated in Table 2.

Table 2: Project success measures

Success Dimension	Success measures
Group I-Internal Criteria	▪ Time
	▪ Cost
	▪ Quality
Group II-Customer	▪ Project Outcome
	1. Customer Satisfaction
Group III-Business	▪ Financial benefit
	▪ Enhanced Market competitiveness
Group IV-Overall	▪ Overall Project Success

Source: Patanakul et al. (2010)

2.5. PMTT Usage in Projects for Internal or External Customers

Besner and Hobbs (2008) state that projects for internal customers are managed quite differently from those for external customers. In project involving external customers, usage of 'scope planning' and 'control', 'contract management', 'cost estimating', 'quality control' and 'risk management' are among the tools most often used in project for external customers. On the other hand 'cost-benefit analysis' was found rarely used in projects for internal customers. This tool is applied in identification phase of the project life cycle in order to carry out project evaluation activities in projects for internal customers. Therefore it can be said that there is limited usage of PM tools and techniques in projects for internal customers

2.6.Project Management and Organizational Culture

Organizational culture is defined as the set of values, beliefs, and behavioral norms that guide how members of the organization get work done. Many organizational factors were attributed to team effectiveness. Organizational context is defined as management processes, organizational culture, and organizational systems that exist within an organization. Early studies have confirmed that companies that place emphasis on key managerial components, such as customers, stakeholders, employees, and leadership outperform those that do not have these cultural characteristics (Kotter & Heskett, 1992; Wagner & Spencer, 1996). Project management maturity is an important element of strategic planning, as it provides a methodology and a road map to determine and compress the gaps in resources and quality (Kerzner, 2005). PMM models provide a standardized approach to measurement and benchmarking, as well as a mapped-out strategy for improvement.

2.7. Project Familiarity and Similarity

The study (Besner and Hobbs, 2008) reveals that three tools, the 'project charter', the 'ranking of risks', and the 'decision tree' are used more often by organizations which are managing projects different from each other. For example the project charter is in limited use in case of similar projects as there is no need to define the project scope every time. Inversely it is frequently used in organizations where projects are different type. Similarly the ranking of risks is used frequently because risk identification needs to be done where projects differ. The decision tree is also used extensively in organizations where projects are not similar and where additional analysis is needed to describe the project. These findings may imply on organizations where projects are similar and three tools mentioned above are in limited use.

2.8. Value Creation Aspect of PMTT

Many project management tools create value as help in minimizing the cost and maximize the project performance and outcomes. There are some value oriented tools in PM's tool box such as 'earned value management' (EVM), a tool that measures cost and schedule performance during project execution. In addition, financial measurement tools like 'cost/benefits analysis' (CBA) also helps to gauge organizational value. Useful information is gained using these tools for decision making (Besner and Hobbs, 2006). Thamhain (1998) examined 29 PM tools and techniques to determine their level of use and the perceived value and concluded that PM tools and techniques contribute to project success provided project managers incorporate them into PM processes effectively and the project team adhere these processes.

2.9. Limited Use of Risk Management Techniques

Raz and Michael (2001) conducted a study using randomly selected sample of 400 project managers. The aim was to identify frequently used tools related to successful project management in general, effective project risk management in particular. Generally, organizations that give more value to tools related to risk analysis, seem to manage their projects more effectively and efficiently. In planning phase three tools were found limitedly used including cost and benefit analysis, cause and effect analysis, and project re planning for alleviating risk. More value of risk management process near to project mangers determines their likely attitude towards applying risk

planning tools. The reason of limited use of formal risk planning tools is less value given to risk management process by the project manager.

2.10. Limited Usage of Quality Control Management Tools and Techniques

David and Elaine (2005) stated that quality planning is important to satisfy customers and to develop products and processes. Quality planning process involves activities like quality goals set up, customer needs identification, product development according to customer demands, devising process controls and quality performance evaluation. To evaluate PM practice and to devise a mechanism for continuous improvement in UK construction industry based on quality planning process David and Elaine (2005) identified a list of most frequently used tools/techniques. Out of more than 50 identified tools/techniques half of them were found in limited usage.

David and Elaine (2005) found quality control; performance measures and technology were frequently used practices using customer satisfaction surveys and customer complaints tools. Whereas three least used groups of tools were identified such as a) gathering customer needs, b) organizing customer needs and c) formal methods as shown in the Table 3.

Table 3: Limited use of PM tools and techniques

Least used Group of Tools	Tools/Techniques in Limited Use
Gathering customer requirements	Customer surveys, Brainstorming, Focus groups
Organizing customer needs	Affinity diagrams, Tree diagrams, matrix diagrams,
Formal Methods	Quality function deployment (QFD) Theory of inventive problem solving (TRIZ) Concurrent engineering (CE)

Source: David and Elaine (2005)

The major reason for limited use of tools identified was less attention paid to collecting customer voices that consequently resulted into low quality. Other important reasons included a) the lack of knowledge about these tools; b) low perceived importance corresponding to level of usage. To ensure customer satisfaction, use of tools to gather and organize the voice of the customer was suggested.

2.11. Limited Use of Control Techniques

Rozenes et al. (2006) states that in order to achieve project aims and objectives and to reduce the gap between activities planned and their actual execution control measures are taken. The importance of monitoring and control is evident from the fact that most of the project failures are caused by planning and monitoring. Most often used control techniques include network scheduling and Gantt charts. Despite current advancement in project management field adequate project control methodologies are limited. Better project control may increase project success. The underlying reasons for limited use of control techniques were documented; a) lack of general expertise in team members; and b) lack of clear role description for team members.

2.12. Use of PMTT for Change Management

In today's fast changing environment, effective management of change is subject to appropriate usage of project management tools and techniques. Clarke (1999), conducted a study to analyze project management as a vehicle for change management and found there is limited use of PMTT in many organizations requiring change management. There a large number of complex activities are involved in large projects; their effective management necessitates the planning, organization and control through adopting a number of tools, techniques and methodologies. A greater number of companies are realizing the benefits that can be retrieved by using project management tools and techniques in an appropriate manner for managing change on larger scale.

2.13. Use of Traditional PMTT in Innovative Project Management

According to Chin (2004), there is limited use of PMTT in innovative projects due to limitations of traditional approach of project management in these projects that are more complex and incorporate changes often and more risky. Conforto and Amaral (2010) carried on the study to introduce planning and controlling techniques for projects developing innovative and complex projects and states in light of the literature review that the widely dispersed effective project management practices have some limitations in their application to innovative and complex projects particularly related to product development. Project managers are facing challenge to meet increasing customer demand for projects aiming at preparing innovative and complex products.

2.14. Limited use of PMTT due to Application of Non-Traditional PM Tools

In light of literature Fox and Spence (1998) reported use of computerized project management tool is important for effective project management. The level of satisfaction of project manager increases through obtaining proficiency in using project management tools and that comes through training.

The researcher investigated the current usage of project management tools and the results indicated availability of dozens of project management tools to project managers. However, most of the project managers found using a small proportion of these tools, and Microsoft Project was the most widely used tool. They were also found using non-traditional PM tools, such as Microsoft Excel more frequently. It was also found that training on the use of a project management tool may enhance satisfaction level of a project manager and give him confidence in applying the tools. Thus, the reasons of limited use pf PMTT could be the use of non-traditional tools and techniques; lack of satisfaction on tool due to lack of training and proficiency in tool usage.

3. Results and Discussion

It was evident from the literature review that prior research didn't distinct the use of project management tools and processes in context of limited usage rather it investigated most commonly used project management processes and their relevance and impact of project success has been investigated. Moreover it was also found that there is little research done regarding how well or how effective projects managers use PMTT. The dissertation focused on general application areas and processes and investigation is restricted to use of PM tools and techniques. Various reasons of limited use of PMTT identified and investigated are given in following paragraphs.

The lack of available research and knowledge on benefits and advantages of PMTT does not facilitate project managers to use them effectively in projects. It has also been observed that in most of the literature, PMTT are discussed with considerable focus on construction projects and less knowledge available with respect to other sectors such as production sector, manufacturing, SME's, etc.

In light of research based on empirical evidences it has been determined that the use of PMTT is usually perceived for large projects by the practitioners. Project management practices were widely used across common knowledge areas such as time, cost and scope but have limited use in areas of HR, Risk management, communication, quality, Control and procurement. Thus, there is not significant research available focusing on limited use of PMTT in a holistic manner. Limited research is also a reason of limited use of PMTT because of limited available of knowledge.

Use of PMTT is considered one aspect of PM practice. Limited research is available on use of PMTT rather different practices have been investigated by many researchers. There is also a debate going on generic and contextual aspects of PM practice. As *PMBOK® Guide's* gives general overview of PM skills, tools and techniques that are considered not compatible and adequate for complex projects near to many researchers and some other researchers consider basic tools box of PM can be applied in all contexts in all projects. However, several researchers related proper use of PMTT with the project success and argued improper use of PMTT may lead to project failure.

According to most of the researchers the reason of limited use of PMTT in complex projects in their inability to match with the requirements of these projects. This study further reveals that there are several PMTT are used across project phases but few of them contribute to success of project. Different PMTT are used in different phases to achieve specific objectives and better use of these tools result into better performance. PMTT contribute to project success provided these contribute to project success measures across different project phases. The use of PMTT can be counterproductive means may contribute negatively if applied on phases where these contribute negatively to success measures. This can be said as a reason of limited use of tools and techniques. On the other hand frequently used tools and techniques does not mean that they may bring success always, if there use impact negative to success measures like time, cost, and scope, etc.

Use of PMTT is limited in projects due to lack of comprehensive knowledge about impact of their usage. PMTT are mostly adopted based on popularity or perceived importance (can't be true always) by practitioners and organizations. Some times formal and structured procedures in organizations provide guideline to project managers and influence their selection of PMTT.

Quality and risk related tools and techniques were found in limited use due to less preference was given to softer dimensions of project management such as HR, quality, communication, etc. According to some researchers much and frequent use of PMTT takes place in larger projects due to their better time, cost and integration controls characteristics, whereas small companies are considered resource constraint and can not afford applying PMTT due to high cost. It is evident from several studies that application of relevant PM practices enhances project performance.

In light of empirical evidences other tools and techniques in limited use include 'Progress Reports', 'Monte Carlo analysis', 'Critical chain method (CPM)', 'Quality function deployment (QFD)', 'Innovative bidding'. Reasons identified for limited use of these PMTT were limited support from organization, resource limitation, innovative, varying contexts, lack of knowledge and expertise. Reasons of limited use of Database tools were again limited

support and resources required from organizations. However reason of limited use of some tools is that these are not applicable in all contexts or in all projects such as 'Critical chain method', 'QFD', 'Innovative bidding tool'. As these tools are specific to construction projects only. Other than that reason of their limited use can be insufficient knowledge about the tool itself. Monte Carlo and decision tree were found quite often in literature as least used tools while these are mentioned as frequently used techniques in PMBOK. In this context, inconsistency with the *PMBOK® Guide's*, some researchers have suggested re evaluation of these techniques by the PMBOK Guide team.

The reasons of less than very limited use of 'Decision tree' 'QFD', 'Control chart', 'Cause and effect diagram, were investigated as not being used according some researchers due to non applicability. The reasons of very limited use of stake holder analysis reported was sensitivity issues related to its use. This is the tool that generates very sensitive information therefore organizations avoid using it and if use don't take its usage on record. However earned value technique was considered for mega projects. Some researchers argue the technique can be adopted by small projects after eliminating its drawbacks. Feasibility study was found in moderate use.

Therefore decision of project mangers to select tools better for their projects influence by organizational strategy and support. In some cases project managers enjoy autonomy in selecting tools and techniques that don't require support form organization, such as Gantt chart, its use does not require specialized resources. More the organization is big, more formalized structure for PMTT to use, and less project manager's autonomy to choose PMTT according to his desire. Therefore company's support is required to project managers. Tools on low autonomous level identified were trend chart, S-Curve, Pareto diagram, control charts, QFD, Monte Carlo and PM software.

Moreover PM tools are more frequently used in mature organizations as their projects are well defined while limited use of tools were observed in less mature organizations due to less autonomy found in mature organizations and support is needed, as stated above. Use of monitoring and control tools, PM software and risk management were found in limited use in small projects and frequently used in large organizations. Tools using large organizations may not be applicable to small organizations.

There is limited use of cost benefits analysis in projects involve internal customers. Tools like project charter, data bases for cost estimating and data bases for lessons learned were found in limited use in projects that are not well defined. Researcher found that there are some projects that are similar in nature therefore there is limited use of some tools like 'project charter', 'ranking of risk', 'decision tree' as these are not required in similar projects.

Several researchers argued that there are some tools that are very effective but being used limited way due to lack of organizational support, such as 'tools lessons learned', 'historical data', 'risk and cost estimating'. They further argue that potential of some tool and techniques has not been fully exploited yet much effective but are in limited use such as risk management tools (risk documents, ranking of risks, data base of risk and contingency plans).

On the other hand there are tools are identified that have frequent usage but still have much potential that is not being explored, these type of tools include 'lesson learned/postmartem', 'requirement analysis', 'scope statement', 'WBS' 'software for monitoring' 'project schedule', 'software for task scheduling', 'software for resource scheduling'. However practitioners were not found considering 'Monte Carlo' important. Tools like 'earned value management' 'feasibility study' 'stakeholder analysis' were found had higher intrinsic value and but were underutilized The underlying reasons are lack of organizational support to exploit these tools to project success.

Reasons of limited use of PMTT such as 'cost and benefit analysis', 'cause and effect analysis' and 'project re planning', and 'risk management' were found less value given by the organizations, high cost and lead time required for implementation and training of personnel on use of these tools and techniques.

However, it was suggested that in order to achieve comparative advantage distinguished PMTT that are better performers should be selected. It was found that risk management tools and techniques are used in organizations /sectors where higher uncertainties and robust decision making takes place.

Quality control tool customer survey', 'brainstorming', 'focus groups', 'affinity diagrams', 'QFD', etc. were also found among tools in limited use and reasons are attributed to lack of knowledge, perceived importance to quality aspect and less attention paid to customer voices that may result into low quality. Ineffective cost management.

EVM, PERT and network analysis techniques were found in limited use in public and private organizations as well. Additionally adoption of non traditional tools for project management was also the reasons of limited use of Risk management and Value Management techniques.

Reason of limited usage of PERT technique was that organizations perceive it inappropriate planning technique in dealing with complex projects.

Use of PMTT for change management is increasingly realized by number of companies. PMTT like TQM, WBS, and MIS are investigated as limited used by practitioners and reasons determined are high cost, poor understanding of project managers. However, it was found that PMTT contribute in project performance, in reducing operating cost and improving quality.

To work effectively in today's fast changing environment research sheds light of importance of adopting techniques like complexity management, risk management, awareness of project teams, communication skills and more importantly need is felt for people oriented approach rather following rigidly PMTT without understanding and expertise. More people oriented approach through developing self centered, self disciplined and empowered teams. It is due to the fact that its people who have to use PMTT therefore their motivation and involvement is considered must for project success in current arena.

Reasons of limited usage of evaluation techniques were also documented and mainly included individual misunderstanding of the concept of evaluation criteria and ambiguities in understanding clearly the purpose.

Many researchers have discussed Earned Value Management (EVM) techniques, its limited use, in contrast with its likely importance. At some places in literature it is mentioned as underutilized tool (below level of average usage). Much likely reasons of its limited use investigated include its draw backs, such as its inability to incorporate quality and design and technology aspects of project. Other empirical evidences document reasons of limited use of EVM as appropriate implementation of technique requires timely accurate cost data input and inappropriateness in handling and using the tool due to lack of training and inadequate understanding of the approach. Lack of ineffective implementation of total quality management techniques (TQM) are reported as reasons of its limited use.

In case of SME's PMTT like PERT-CPM, Technology diffusion and risk management were found in limited use by researchers most often reviewed. Reasons investigated include availability of limited resources in terms of finances, technical expertise and poor management skills, lack of specialization, etc. Coupling with restricted budgets and perceiving cost associated with deploying PMTT, these SME's don't likely to spend on PMTT. Although it was found that usage of PMTT have greater impact with respect on cost reduction and quality control.

General reasons for limited use of PMTT documented in literature include company's support is required to project managers to Implement specific tools and techniques in terms of financial resources, lack of general expertise regarding usage PMTT, informal project management practices using non-traditional PMTT such as use MS Excel, as a non specialized tools.

Now it has been widely realized that in order to get better project performance and to be distinguished in today's highly competitive market. It is important to adapt different project management practices for different projects having different contexts as PM practices vary with respect to application area and context. The extent of variation of PM practices is determined by the characteristics and environment of projects.

4. Conclusion and Recommendations

Better knowledge and understanding about how to use project management tools and techniques is imperative for project performance. This study was cross-sectional and generalized wherein various aspects of the underlying problem (reasons of limited use of project management) were discussed in various contexts. A significant insight has been gained and presented in form of the relative use of different PM practices.

The significant relationship between use of PMTT and improved project performance is shown in this research through empirical support. The effectiveness of the various project management methodologies, practices, and tools is related to achieving project success; and impact of factors within the organization and outside the organization on project performance has been discussed. However, the current literature is not adequate to ascertain what measures of project success are currently in use and how valid these measures. In view of reasons of limited use of PMTT that are identified and evaluated in this study and the impact of use and application of PMTT towards success, organizations, particularly projects project managers hold the responsibility to employ PMTT that match the characteristics of phases and that are significant contributors to success measures in each phase of the project life cycle. Thus this research emphasizes role of organizations and PM practitioners in implementing the project management practices and use of PMTT. They should improve their skill base and knowledge in this discipline through training and certification of people managing projects.

The PM methodology should match with the types and sizes of projects within an organization. The PM methodology should be selected that helps project team in developing clear understanding about scope of the project and project objectives should match with the goals of the organization. Organizations should develop PM methodology that is more dynamic,

flexible and adaptive, easy to tailor (for type of project).

Under the ambit of the literature review used in this study a list of commonly identified PMTT reported by most of the researchers is prepared and presented below i.e., communication, control and procurement, Quality and risk related tools, 'Progress Reports' HR , 'Monte Carlo analysis', 'Critical chain method (CPM)', 'Quality function deployment (QFD)', 'Innovative bidding', Database tools, ' 'Decision tree' 'Control chart', 'Cause and effect diagram, Feasibility study, trend chart, S-Curve, Pareto diagram, PM software, cost benefits analysis, project charter, data bases for cost estimating and data bases for lessons learned, 'historical data', earned value management' 'stakeholder analysis', customer survey', 'brainstorming', 'focus groups', 'affinity diagrams', WBS, and MIS.,

Common reasons identified and included in this research i.e.,: limited available research, project complexity, inability of match with project requirements, negative contribution to project success measures, lack of knowledge about impact of PMTT usage, adoption based on popularity or perceived importance, structured procedures in organizations, less preference to softer dimensions of project management, resource constraint, limited organization support, innovative, varying contexts, lack of knowledge and expertise. Insufficient knowledge about the tool itself, non applicability, less autonomy to project managers in selecting tools, perceived importance, high cost, technical expertise, poor management skills and lack of specialization.

The projects which are more at risk necessitate application of formal quality and risk management practices. The goal of this study was to explore limited use of project management practices (tools and techniques) among organizations of varying size and in different sectors. Greater emphasis on people is required than ever, as they are instruments of project management, equally important like PMTT. The issue found during study that despite much importance project management is still deficient in theoretical ground and concepts.

In light of literature review following framework is proposed for Implementation of Project Management Tools and Techniques:

- Establishment of Project Management Office (PMO);
- Assessment of current PM practices against PM Frameworks given in literature and PM organizations;
- Assessment of project contexts and selection of appropriate PM practice (PMTT);
- Training in PM practices to obtain both hard and soft skills;
- Implementation of controls to ensure compliance with established PM; and Practices to complete projects in time and on budget and desired outcome.

Periodic re-evaluation of project management practices and tools and tailors them according to the increasing complexity and needs. As it needs to confirm the tools that are actually meeting the needs of the project. The use of project management devices (techniques, tools, methods) should match to the characteristics of both a certain project and its organization. Project managers need to be trained and skilful in managing their projects successfully. Last but not the least they should choose PMTT that really contribute to the success of the project instead their frequent usage by others). More efforts to promote tools to facilitate client requirements and tools to measure initiative performance are needed. In the future, in wake of more improvements in PM standards and availability of more education and training more emphasis on softer areas of PM practice is expected.

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References

1. Ahuja, H., Dozzi, S.P., & AbouRizk, S. M. 1994, *Project Management techniques in planning and controlling Construction Projects*. 2nd ed., Wiley, New York.
2. Andongndou. W., Laxton, D., Marsh, R. & Pressler, R. 2009, *FCS Project Management* [online], Pearson Education south Africa (PVT) ltd. Available at: http://books.google.co.uk/books?id=dCV7fETnW74C&printsec=frontcover. [Accessed September. 1, 2010].
3. Besner, C. & Hobbs, B. 2004, An Empirical Investigation of Project Management Practice: In Reality, Which Tools do Practitioners Use? PMI Research Conference 2004, London, UK.
4. Besner, C., & Hobbs, J. B. 2006, 'The Perceived Value and Potential Contribution of Project Management Practices to Project Success', *Project Management Journal*, vol. 37, no. 3, 37-48.
5. Besner, C., & Hobbs, J. B., 2008, 'Project Management Practice, Generic or Contextual: A Reality Check', *Project Management Journal*, vol. 39, no. 1, 16-33.
6. Billi, S. & Raymond, L. 1993, 'Threats and opportunities for small and medium-sized

enterprises', *Journal of Information Management,* vol. 13, no. 6, 439-448.
7. Buttrick, R. 2000, *The Project Workout*, 2nd edn. Financial Times Management, London
8. Cash, C. & Fox, R. 1992, 'Elements of Successful Project Management', Journal of Systems Management, vol. 8, no. 4, 10–12.
9. Chin, C. M. M. & Spowage, A. C. 2010, 'Defining & Classifying Project Management Methodologies, *PM World Today, v*ol XII, no. V, 16-32.
10. Chin, G. 2004, *Agile Project Management: How To Succeed in the Face of Changing Project Requirements*. AMACOM, NY.
11. Clarke. A. 1999, A practical use of key success factors to improve the effectiveness of project management. *International Journal of Project Management, v*ol. 17, no. 3, 139-145.
12. Cleland, D. 1998, *Strategic project management*, In: Pinto, J. K., Project Management Handbook, San Francisco, CA: Jossey-Bass Publishers, pp. 27–54.
13. Conforto C.D. & Amaral C. D., 2010. Evaluating an Agile Method for Planning and Controlling Innovative Projects. *Project Management Journal, v*ol. 41, no. 2, 73-80.
14. Crawford, L. & Pollack, J.B. 2007, 'How Generic are Project Management Knowledge and Practice', *Project Management Journal*, vol. 38, no. 1, 87-96.
15. David J. & Elaine M., 2005. Improvement tools in the UK construction industry. *Construction Management and Economics*, vol. 23, no. 9, 965–977.
16. Davidson, J.F. 2002, *The new project management-tools for an age of rapid change, complexity, and other business realities* [online] San Francisco : JOSSEY-BASSA Wiley company, CA "Available at: http://books.google.co.uk/books?id=ZOG2mr6qJ_sC&printsec=frontcover" [Accessed Jul. 14, 2010].
17. Ellis, R.C.T, Wood, G.D & Keel, D.A. 2005, 'Value Management practices of leading UK cost consultants', Construction Management and Economics, vol. 23, no. 5, 483-493.
18. Fox, J. & Murray, C. 2003, 'Conducting Research Using Web-Based Questionnaires: Practical, Methodological, and Ethical Considerations', *International Journal of Social Research Methodology*, vol. 6, no. 2, 167–180.
19. Fox, T. L. & Spence, J. 1998, 'Tools of the Trade: A Survey of Project Management Tools'. *Project Management Journal*, vol. 29, no. 3, 20-27.
20. Furumo K., Pearson, J. M. & Martin, N. L. 2006, 'Do Project Management Tools and Outcomes Differ in Organizations of Varying Size and Sector'? *Interdisciplinary Journal of Information, Knowledge and Management*, vol. 1, no. 3, 23–36.
21. Gowan, J. & Mathieu, R. 2005, 'The importance of management practices in IS project performance: an empirical study', *Journal of Enterprise Information Management*, vol. 18, no. 1/2, 235–255.
22. Gray, C.F. & Larson, E.W. 2008. *Project Management: The Managerial Process*, 4th ed., McGraw Hill.
23. Hallgren M. & Maaninen-olsson E., 2005, 'Deviations, Ambiguity and Uncertainty in a Project-Intensive Organization'. *Project Management Journal,* vol. 36, no. 3, 17-26.
24. Hatfield, M. 1995, 'Managing to the Corner Cube: Three-Dimensional Management in a Three-Dimensional World', *Project Management Journal*, vol. 26, no. 2, 13–20.
25. Karen E.; Beise, C. & Quan, J. 2010, 'Do project managers practice what they preach, and does it matter to project success'? *International Journal of Project Management*, vol. 28, no. 7, 650-662.
26. Kerzner, H. 2000, *Applied Project Management: Best Practices on Implementation*. New York, NY: John Wiley & Sons, Inc.
27. Kotter, J. P., & Heskett, J. L., 1992, '*Corporate culture and performance'*. New York: The Free Press.
28. Kul, B. & Uppal, P. E. 2009,' Cost Estimating, Project Performance and Life Cycle. *AACE International Transactions*, AACE International, TCM.03., p1-9. Available through: EBSCOhost [Accessed Aug. 20, 2010].
29. Kwak, Y. H., & Ibbs, W. C. 2000, 'Calculating project management's return on investment'. *Project Management Journal,* vol. 31, no. 2, 38-47.
30. Leopoulos, V., Kirytopoulos, K. & Malandrakis, C. 2006, 'Risk Management for SMEs: Tools to use and how', *Production Planning & Control*, vol. 17, no, 3, 322-332.
31. Loo, R. (2002), 'Working towards best practices in project management: a Canadian study', *International Journal of Project Management*, vol. 20, no. 5, 93–98.
32. Maylor H., 2001. 'Beyond the Gantt Chart: Project Management moving on'. *European Management Journal*, vol. 19, no. 1, 92-100.
33. Milosevic, D, Z., & Ozbay A. 2001. Delivering projects: What the winners do. Proceedings of the 33rd Annual PM! Seminars and Symposium, Nashville, TN, USA.
34. Milosevic, D. Z. 2003, *Project Management toolbox*, New York, NY: John Wiley and Sons
35. Milosevic, D. & Patanakul, P. 2005, 'Standardized project management may increase development project success', I*nternational Journal of Project Management*, vol. 23, no. 3, 181-192.
36. Milosevic, D.Z. & Iewwongcharoen, B. 2004, Management Tools and techniques: The contingency use and their impacts on project success. Proceedings of the 3rd PMI Research Conference, London, England.
37. Munns, A. K. & Bjeirmi. B. F. 1996, 'The role of project management in achieving project succes'.

International Journal of Project Management, vol. 14, no. 2, 81-87.
38. Murch, R. 2001, *Project management best practices for IT professionals*, Prentice Hall
39. Murphy, A. & Ledwith, A. 2006, 'Project Management Tools and Techniques in High-Tech SMEs in Ireland. In: Department of Manufacturing and Operations Engineering' *High Technology Small Firms Conference 2006*, [online], p1-15, Available at: *http://www.cpm.ul.ie/courses/files/Paper%202006-05.pdf,* [Accessed Aug.10, 2010].
40. Papke-Shields, K. E, Beise, C. & Quan, J. 2010, 'Do project managers practice what they preach, and does it matter to project success?. *International Journal of Project Management*, vol. 28, no. 7, 650-662.
41. Patanakul, P., Iewwongcharoen, B. & Milosevic, D. 2010, 'An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success'. *Journal of General Management,* vol. 35, no. 3, 41-65.
42. Pinto, J. K., & Slevin, D. P. 1988, 'Project Success: Definitions and Measurement Techniques' *Project Management Journal*, vol. 19, no. 1, 67–72.
43. PMI 2000, Project Management Institute, 1996, 2000, 1-880410-23-0, Project Management Institute, Pennsylvania, *PMBOK Guide: A Guide to the Project Management Body of Knowledge, 2000 Edition*.
44. PMI. 2004,. A Guide to the Project Management Body of Knowledge: Third Edition (PMBOK@Guide), PA, USA, Project Management Institute.
45. Project Management Learning 2010, What are the advantages and disadvantages of using MS Excel for project management [online] <http://www.projectmanagementlearning.com/what-are-the-advantages-and-disadvantages-of-using-excel-for-project-management.html> [Accessed on Aug. 05, 2010
46. Raz, T. & Michael, E., 2001, 'Use and benefits of tools for project risk management'. *International Journal of Project Management*, vol. 19, no.1, 9-17.
47. Rodrigues, A. & Bowers, J. 1996, 'The role of system dynamics in project management'. *International Journal of Project Management*, vol. 14, no. 4, 213-220.
48. Rozenes, S. 2006, 'Project Control: Literature Review'. *Project Management Journal, v*ol. 37, no. 4, 5-14.
49. Sdrolias, L., Sirakoulis, K. & Trivellas, P. 2005, Applicability of Project Management Techniques in SMEs: Evidence from Greece**.** *Studia Universitatis Babes Bolyai - Negotia* vol. 8, no. 1, 41-49.
50. Shenhar, A. J. 1998, 'From theory to practice: Toward a typology of project management styles'. *IEEE Transactions on Engineering Management*, vol. 45, no. 1, 33-48.
51. Shenhar, A. J. 2001, 'One Size Does Not Fit All Projects: Exploring Classical Contingency Domains', *Management Science*, vol. 47, no. 3, 394–414.
52. Shenhar, A.J. & Dvir, D. 2004, *How projects differ, and what to do about it*, The Wiley guide to managing projects, P.W.G. Morris and J.K. Pinto (Editors), Wiley, Hoboken,NJ, pp. 1265–1286.
53. Soraya J. N. 2003, *Project Management Failure: Main Causes*. Post Graduate: Bowie State University.
54. Thamhain, H. J. 1996, 'Managing Self-Directed Teams Toward Innovative Result', *Engineering Management Journal*, vol. 8, no. 3, 14-27.
55. Thamhain, H. J. 1998, *Integrating Project Management Tools with the Project Team.* Long Beach: 29th Annual Project Management Institute Seminars & Symposium.
56. Thamhain, H. J. 1999, Emerging Project Management Techniques: A Managerial Assessment, Portland International Conference on Management of Engineering and Technology, Portland, Oergon, USA
57. Thomas, J., & Mullaly, M. 2007. 'Understanding the value of project management: First steps on an international investigation in search of value'. *Project Management Journal*, vol. 38, no.3, 74–89.
58. Wagner, D. B., & Spencer, J. L., 1996, The role of surveys in transforming culture: Data, knowledge, and action. In A. I. Kraut (Ed.), Organizational surveys: Tools for assessment and change (pp. 67–87). San Francisco: Jossey-Bass.
59. White, D. & Fortune, J. 2002, 'Current Practice in Project Management - an empirical study', *International Journal of Project Management*, vol. 20, no. 1, 1-11.
60. Winch, G.M. & Kelsey, J.M. 2005, 'What do construction planners do? *International Journal of Project Management, vol.* 23, no. 2, 141-149
61. Wirth, I. 1992, 'Project-Management Education: Current Issues and Future Trends' *International Journal of Project Management*, vol. 10, no. 1, 49-