

QUANTITATIVE BENCHMARKING OF PROJECT MANAGEMENT (PM) PROCESSES

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ABSTRACT

This study, sponsored by the Project Management Institute (PMI), examines current PM levels and practices in various companies and industries. First, this research develops a five level PM Process Maturity Model to better understand levels of PM sophistication. Second, a PM process maturity benchmarking methodology is developed and presented to measure an organization's current PM level quantitatively. This paper summarizes the initial results of PM process maturity benchmarking. It also analyzes the quantitative relations between an organization's PM maturity and its PM effectiveness by applying this research methodology.

INTRODUCTION

The principal goal of this research is to determine the organizational and financial benefits to organizations that result from the implementation of PM tools, practices and processes. PM benchmarking results are collected and presented to compare organization's current PM practices strength, weakness, and room for improvement.

Previous research in PM identified some of the benefits although in qualitative and anecdotal fashion. Such benefits include improving organizational effectiveness, meeting quality standards, and fulfilling customer satisfaction [Al-Sedairy 94][Boznak 88][Bu-Bushait 89][CII 90][Deutsch 91][Gross 90][Ziomek 84]. This research was however, very general and largely unsubstantiated. In other

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words, it was not very supportive to managers trying to answer fundamental and challenging questions regarding PM needs, advantages, and *quantitative* benefits.

By presenting quantitative relationships and benefits of PM processes, this study will enable managers to determine when and how to apply PM. Such information will help managers better understand and respond to queries from top managers about the cost effectiveness of project management.

RESEARCH STEPS

The following are the research steps for this study.

1. Determine research needs of quantitatively benchmarking PM processes.
2. Develop a PM Process Maturity model.
3. Develop a comprehensive 148-question benchmarking instrument to assess PM Process Maturity.
4. Select target organizations/industries to benchmark.
5. Measure an organization's PM maturity level and actual project performance.
6. Breakdown collected information to benchmark specific criteria.
7. Identify an organization's PM strengths and weaknesses.
8. Provide suggestions and recommendations for PM maturity improvement.

This study develops a 5-level PM Process Maturity (PM)² Model to better understand and locate an organization's current PM process level [Figure 1]. This (PM)² Model is developed by adopting Crosby's five-level maturity model [Crosby 79], SEI's capability maturity model [SEI 93] and McCauley's organizational maturity model [McCauley 93] as primary references.

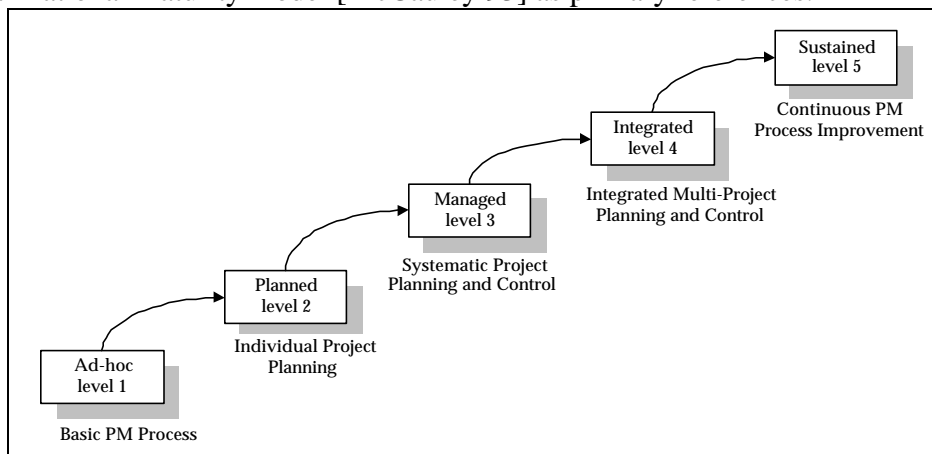


Figure 1 5-Level PM Process Maturity (PM)² Model

PM PROCESS MATURITY BENCHMARKING RESULTS

The scope of this study was to take a broad view of PM in terms of the industries and applications. This research carefully selected and recruited companies to participate in PM Benchmarking Study.

Organizational Demographics

38 companies from 4 different industries have participated in this study: 15 companies from Engineering and Construction (EC), 10 companies from Information Management and Movement (IMM, a.k.a. telecommunications), 10 companies from Information Systems (IS, a.k.a. software development), and 3 companies from Hi-Tech Manufacturing (HTM). Both private sectors and public sectors were examined.

Number of Years in PM Practices

Numbers of years in PM practices answers ranged from 1 to 50 years, with averages of 15.4 years for EC, 10.7 years for HTM, 8 years for IS, and 6.8 years for IMM. The average years was 10.7 years. 61% of the organization had less than 10 years of experience with PM.

Annual Cost of PM Services

Annual cost of PM services were computed as a percentage of a company’s or department’s revenues or sales if that organization were entirely projectized. The average cost of PM services as a percentage of PM spending was 6%. 80% of the companies answered that they spend less than 10% of total project cost on project management.

Overall PM Maturity

The overall PM Maturity of the 38 organizations and 4 industries ranged from a low of 3.06 to a high of 3.36 for EC. Average overall PM maturity was 3.26. Since the rating scale ranged from 1 (Low) to 5 (High), there is still a substantial opportunity for improvement of PM practices for all 4 industries. Table 1 and Figure 2 compares overall PM Maturity of 4 different industries.

Industries	EC	IMM	IS	HTM	All Companies
PM Maturity	3.36	3.30	3.06	3.34	3.26
Standard Deviation	0.66	0.77	0.88	0.87	0.74

Table 1 Overall PM Maturity (4 industries)

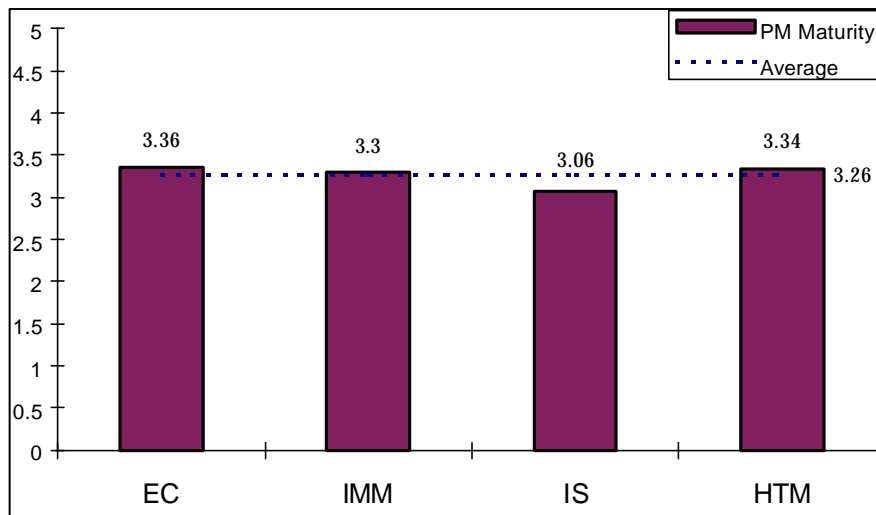


Figure 2 Overall PM Maturity (4 industries)

Functional Management Areas PM Maturity

In accordance with the Project Management Body of Knowledge from PMI [PMI 94], we studied 8 functional management areas: Scope, Time, Cost, Quality, Human Resource, Risk, Communications, and Procurement. Table 2 shows the benchmarking results for these functional management areas.

Functional Management Categories	EC	IMM	IS	HTM	All Companies
Scope	3.52 (Max)	3.45	3.25 (Min)	3.37	3.42
Time	3.55 (Max)	3.41	3.03 (Min)	3.50	3.37
Cost	3.74	3.22	3.20 (Min)	3.97 (Max)	3.48
Quality	2.91	3.22	2.88 (Min)	3.26 (Max)	3.06
Human Resources	3.18	3.20 (Max)	2.93 (Min)	3.18	3.12
Communications	3.53 (Max)	3.53 (Max)	3.21 (Min)	3.48	3.44
Risk	2.93 (Max)	2.87	2.75 (Min)	2.76	2.85
Procurement	3.33 (Max)	3.01	2.91 (Min)	3.33 (Max)	3.14
Overall Functional Management Maturity	3.34	3.24	3.02 (Min)	3.36 (Max)	3.24

Table 2 Results of 8 Functional Management Areas PM Maturities

EC companies, as a composite, scored highest in 5 functional management areas which were scope, time, communications, risk, and procurement management. Cost management marked the highest, and risk management scored the lowest PM Maturity among all 8 functional management areas. It seems that all 4 industries are very concerned about cost management. Also, all organizations were weak on risk management area.

Figure 3 presents the result of PM Benchmarking study for EC only. EC scored above average on scope, time, cost, and communications. EC scored below average on quality, human resource, risk and procurement. Quality and risk management areas are consistently in needs of substantial improvement.

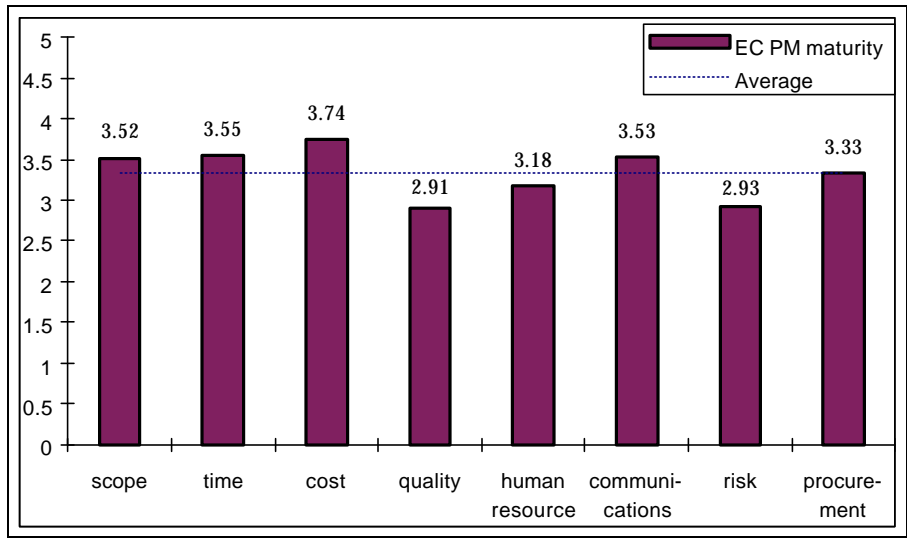


Figure 3 Functional Management Areas PM Maturity (EC industry)

Project Lifecycle Phases PM Maturity

The study team proposes a generic PM lifecycle phases to measure, compare, and benchmark different PM lifecycle phases accurately. In this study, PM Lifecycle Phases are breakdown into 6 different phases: Initiate, Define and Organize (D&O), Plan, Track and Manage (T&M), Close out, and Project-driven organization environment. The area of Project-Driven Organization Environment was added to investigate integration aspects and organizational issues of the other five PM lifecycle phases.

Table 3 shows the benchmarking results of 6 project lifecycle phases. EC scored the highest in define and organize, and track and manage phases, and lowest in the initiate phase.

PM Processes	E-C	IMM	IS	HTM	All Companies
Initiate Maturity	3.25 (Min)	3.34	3.57	3.60 (Max)	3.39
Define & Organize Maturity	3.61 (Max)	3.49	3.43 (Min)	3.55	3.53
Plan Maturity	3.31	3.27	2.90 (Min)	3.32 (Max)	3.19
Track & Manage Maturity	3.55 (Max)	3.31	2.98 (Min)	3.25	3.31
Close Out Maturity	3.28	3.43 (Max)	2.90 (Min)	3.05	3.2
Project-driven Org. Environment	3.14	2.99	2.73 (Min)	3.25 (Max)	3.00
Overall PM Processes Maturity	3.36 (Max)	3.31	3.09 (Min)	3.34	3.28

Table 3 Results of 6 Project Lifecycle Phases PM Maturities

Figure 4 presents the result of benchmarking project lifecycle phases for the EC industry only. EC scored above average on the define and organize, and track and manage phases. EC scored below average on initiate, plan, close out, and project organization environment. The Define and organize phase was the highest among the 6 project lifecycle phases.

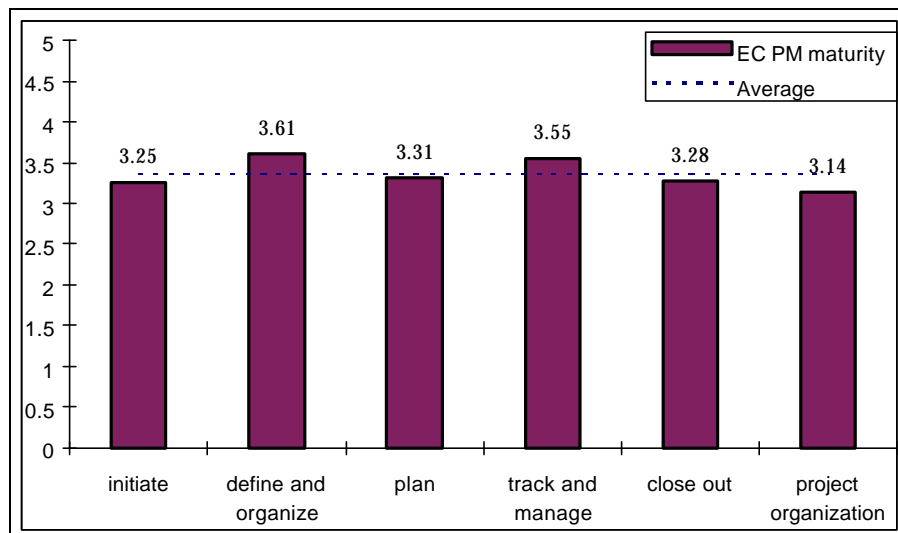


Figure 4 Project Lifecycle Phases PM Maturity (EC industry)

PM PROCESS MATURITY VS. PROJECT PERFORMANCE

This study also analyzes the relationship between organizations PM process maturity and actual project performance. Project performance is measured by the cost or schedule of the project. To evaluate an organization’s project performance, a Cost Index (CI) and a Schedule Index (SI) were developed as below. The smaller the CI and SI, the better the project performance.

$$\text{Cost Index, CI} = \frac{\text{Actual Project Costs}}{\text{Original Budget}}, \quad \text{Schedule Index, SI} = \frac{\text{Actual Project Duration}}{\text{Original Project Duration}}$$

Figure 5 portrays one example of the statistical relationship between PM maturity and the cost index. The slope of the curve indicates that higher levels of PM Maturity were associated with better cost performance of the project. Moreover, the nonlinear function indicates that there is a diminishing return on higher levels of PM Maturity. The data were not statistically significant, possibly because of the small sample size.

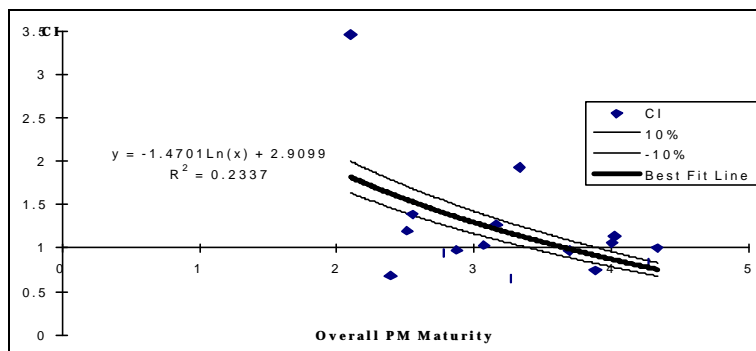


Figure 5 PM Maturity vs. Cost Index, CI

CONCLUSIONS

This research provides solid, comparative studies on PM processes and practices across industries and within an industry. The developed benchmarking tools help organizations identify current level of PM strengths and weaknesses to further improve PM effectiveness.

The results of the study show that even the best companies and industries have substantial room for improvement. Also, this analysis has shown that organizational PM Maturity level and actual project performance were somewhat correlated. This finding could be interpreted to encourage managers to pursue improve PM processes and practices.

This paper is a progress report for benchmarking PM Maturity and for developing a methodology to determine an organization’s return on PM investment.

Future research will continue to report on quantitative results and findings by applying this research methodology. This benchmarking methodology and the resulting quantitative analyses will aid managers in making better PM investment decisions. Other articles in the future will continue this line of inquiry.

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