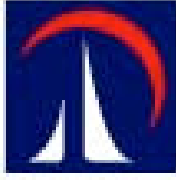


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The Implementation of Maturity Models in the United Arab Emirates

دراسة عن تطبيق معايير النضج في دولة الإمارات العربية المتحدة

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Dissertation submitted in partial fulfillment of
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DISSERTATION RELEASE FORM

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Title

The Implementation Of Maturity Models In The United Arab Emirates

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Glossary of Terms

1. CMM: Capability Maturity Model
2. CMMI: Capability Maturity Model Integrated
3. DM: Dubai Municipality
4. DM-ITD: Dubai Municipality-Information Technology Department
5. DM-ITD PMO: Dubai Municipality-Information Technology Department Project Management Office
6. EPM: Enterprise Project Management
7. ITIL: Information Technology Infrastructure Library
8. OPM3: Organizational Project Management Maturity Module
9. P3M3: Portfolio, Programme and Project Management Maturity Model
10. (PM)2: Project management Process Maturity
11. PMBoK: Project Management Body of Knowledge
12. PMI: Project Management Institute
13. PMO: Project Management Office
14. PRINCE 2: PProjects IN Controlled Environments
15. PRINCE 2 MM: PProjects IN Controlled Environments Maturity Model
16. SEI: Software Engineering Institute

Abstract

The field of project management maturity has been introduced in the Middle East market recently and it is yet to prove its benefits. This research investigates the implementations of such maturity models in the UAE. The objective is to study and compare project management maturity models, show how they can be implemented in the UAE and finally recommend ways to merge different maturity models together to benefit from them the most.

The primary research method used in this research was to document a case study of an implementation of a maturity model in a government organization in Dubai, UAE. Moreover, experts' interviews were also means of primary research used for this research paper. In addition, the secondary research methods were represented by the academic online journals, electronic books and Dubai Municipality documents were used to collect data about maturity models. The dissertation concludes on the relevance and value of these models and provides recommendations for organizations seeking maturity models and recommendations for various project management audiences.

يركز هذا البحث على تطبيقات نماذج قياس نضج إدارة المشاريع المؤسسية في دولة الإمارات العربية المتحدة، والتي تم طرحها في هيئات وشركات الشرق الأوسط في الآونة الأخيرة ولم يتم إثبات فوائدها بشكل كبير حتى الآن. الهدف هو دراسة ومقارنة نماذج النضج في إدارة المشاريع، وبيان كيفية وإمكانية تنفيذها في دولة الإمارات العربية المتحدة وأخيراً توصية سبل دمج نماذج النضج المختلفة معاً من أجل الاستفادة القصوى منها.

كان أسلوب البحث الأساسي المستخدم في هذه الورقة هو دراسة تجربة تنفيذ نموذج النضج في مؤسسة حكومية في إمارة دبي. حيث تم إجراء مقابلات لخبراء في هذا المجال كوسيلة بحث أساسية أخرى. أما بالنسبة لأساليب البحث الثانوية المستخدمة في هذه الورقة التي استخدمت لجمع البيانات حول نماذج النضج فقد شملت المجالات الأكاديمية على الإنترنت والكتب الإلكترونية ووثائق بلدية دبي. يقدم هذا البحث توصيات للهيئات والشركات التي تسعى لتطبيق نماذج النضج في هذا المجال بالإضافة إلى تقديم توصيات للعاملين في مجال إدارة المشاريع بشكل عام.

1 Chapter One: Introduction

1.1 Background

Recently, the significance of effective project management in delivering business value has gained increased attention. Project management methods and processes are now considered effective tools to deliver and respond to changes in organizations. In order to measure the effectiveness of project management processes and practices, the project management maturity concept has emerged recently.

This study was undertaken to fulfill the requirements of modern organizations with achieving their strategic objectives effectively and in a mature manner. Many organizations are now facing new challenges such as changes in the technology, changes in client expectations, changes in methodologies and processes and many others. The high level goal of this research is to help organizations measure their maturity when it comes to project management and therefore, become more flexible in terms of structures and methods in order to achieve their strategic objectives through managing projects effectively.

1.2 Aim of the Research

The aim of this dissertation is to study the implementation of project management maturity models in organizations whether they are supported by project management offices or not. This research is done through case study method and expert interviews related to a government organization in Dubai. This dissertation studies the factors affecting both the implementation of maturity models in government organizations and how those models can improve project management and project management offices.

This dissertation focuses exclusively on project management maturity models for organizations—What should organizations do to achieve maturity?□therefore we will not focus on individual skills of project managers and how to optimize them.

1.3 The objectives

The objectives of this dissertation are as follows:

- 1- Study different kinds of Project Maturity models, Project Management Offices Maturity Models and Process Maturity Models, in terms of how they are structured and their main benefits to organizations

- 2- Investigate the importance of Project Management Offices (PMOs) and how they are structured in organizations
- 3- Identify the reasons behind implementing maturity models in general and their effect on project performance
- 4- Investigate and analyze the implementation of a maturity model through the PMO, which is covered in the case study related to the implementation of Organizational Project Management Maturity Model (**OPM3**) assessment in Dubai Municipality.
- 5- Compare between **OPM3** and Capability Maturity Model Integrated (**CMMI**).
- 6- Define and recommend the requirements necessary to use and implement maturity models effectively and identify when one model can be better than another model.
- 7- Define and recommend the requirements needed to implement a successful **OPM3** implementation in a Project Management Office or project environment in a government organization

1.4 Structure of the research

This dissertation is structured in six chapters that will cover the objectives identified above. Below is a brief overview of each chapter:

- Chapter 2 provides information about Project Management Offices, different maturity models, an overview of each of them, information about OPM3, information about CMMI, a comparison between OPM3 and CMMI, and introduction to Dubai Municipality's case study.
- Chapter 3 provides information about the research methods used in this research. Mainly for this research the researcher will use a qualitative research method through case studies and expert interviews. The case study was extracted from hands on experience in the Project Management Offices when the about OPM3 assessment took place, expert interviews with OPM3 and CMMI consultants, documentations provided by Dubai municipality, Information technology department, project management office and participants observations.
- Chapter 4 this chapter of analysis and results of data collection states the case study about Dubai municipality in implementing the about OPM3. And covers the two experts' interviews (OPM3 expert and CMMI expert).
- Chapter 5 provides the discussion and interpretation of the data collected including the case study and the interviews. And an interpretation of the data collected in light of the literature

review. Also limitations of the research, suggestions for future research and the main findings of the research are covered in this chapter.

- Chapter 6 includes recommendations to government organizations, private organizations, PMOs and project environments, and academic researchers.
- Chapter 7 includes a conclusion for this research study.
- Chapters 8 and 9 include the references and appendix.

1.5 Methodology

This dissertation is based on research journals, newspaper, electronic books, case studies, experts and semi-structured interviews, analyzing government documents and observations which represent the research methods that are considered part of the qualitative research approach. The use of these various research tools for collecting and analyzing data is explained further in the chapter on research methodology.

Case studies and experts interviews were the main research methods for this paper in which interviews were conducted to collect the required data from experts and consultants who have expertise and are familiar with Project Management maturity models.

2 Chapter Two: Review of the Literature

This section of the research will cover a literature review on project management offices, their types, activities and functions. The review will also cover Maturity Models and their effects on Project Performance and also will cover some of well-known project management maturity models and hold a comparison between them.

In this literature review, we try to explore the notion of maturity in project management in a holistic context. The main focus of the literature review is on the implementation of Maturity Models in organizations with Project Management Offices PMOs or without. And also a focus on various maturity models to better understand our topic. The review also analyzes many aspects and elements of various project management and process improvement maturity models and show their effect on the field of project management.

2.1 Project Management Offices (PMOs)

2.1.1 Definition of Project Management Offices (PMOs)

Project Management Offices are defined globally as physical or virtual entities in an organization that deal with activities such as managing, controlling, supporting projects, defining methodologies and frameworks for project management, auditing projects and many other related activities (Dai & Wells 2004).

Project Management Institute defines a PMO as:

“An organizational body or entity assigned various responsibilities related to the centralized and coordinated management of those projects under its domain.”

(Source: Project Management Institute, A Guide to Project Management Body of Knowledge (PMBOK® Guide)- Fourth Edition, 2008, p.11)

PMOs can deal with programs or portfolios along with projects. A project or program office can also be called as a center of excellence or center of expertise (Dai & Wells 2004). The project office (PO) is responsible for offering guidance and help for project managers, teams, and other management levels in applying project management practices, tools and techniques (Hill, 2004). It is stated that a PMO is responsible for the improvement of the "the practice and results" of project management (Kendall & Rollins, 2003).

2.1.2 Roles of Project Management Offices (PMOs)

The roles of PMOs are divided and supported by the main function of PMOs which is knowledge management- into three models: strategic, tactical and operational (Desouza & Evaristob, 2006). At the strategic level the PMO makes sure that the projects are linked with the strategic objectives of the organizations and directly related to the business unit's operational plans and processes. At the tactical level the PMO's role is to make sure that projects are integrated closely and track their progress in comparison with defined constraints. Lastly at the operational level, the PMO gets involved in the operational activities of projects such as evaluations, approvals of documents, review of status reports and collection of lessons learned reports.

(Kendall & Rollins, 2003) divide the roles of PMOs into four models: Project Repository Model: (provides methodology and standards only without monitoring of results), Coach Model: (same as Repository model plus performance is monitored), Enterprise Model: (stronger governance model on a higher level), "Deliver Now" Model: (introducing projects with measurable values within periods of 6 months).

2.1.3 Types of Project Management Offices (PMOs)

Although such an office can manage projects, programs, portfolios or all three, there are different types of each. PMOs are also sorted out into two types: the administrative type and the knowledge-intensive type (Desouzaa & Evaristob, 2006). The administrative PMOs give project managers and project teams the administrative support needed for their projects such as managing project information and reporting it.

However knowledge-intensive PMOs focus on collecting and sharing knowledge as a main function. This can include setting the standards and methodologies of project management, collecting lessons learned, improving performance, assessing maturity of project management, coaching, training and mentoring of project managers.

2.1.4 Responsibilities of Project Management Offices (PMOs)

The main responsibility of a PMO is to make sure that projects are executed successfully in the organization. Moreover, PMOs can be responsible for the alignments between projects and the strategic goals of the organization. Thirdly, PMOs are in charge of putting the standards and methodologies of project or program or portfolio management. They are also responsible for training the managers on those methodologies and ensuring their adherence to the standards (Desouzaa & Evaristob, 2006).

PMOs are responsible for the gaining of knowledge from previous projects' failures and successes though maintaining project historical archives, providing administrative support for projects and sometimes different management levels, and offering consultation and mentoring for project managers and project resources (Dai & Wells, 2004).

2.1.5 Relationship between Project Management Office and Project Performance

A research (Dai & Wells, 2004) conducted showed the relationship between project management offices and project performance. Some of the results of the research showed that the existence of project

management standards was positively correlated with project performance. The research covered organizations with PMOs and organizations without PMOs. It was found that the above statement was true whether there was a PMO or not, however organizations with PMOs showed a slightly higher project performance level but this level wasn't high enough to consider it in the research (Dai & Wells, 2004).

It was argued that the PMO can promote and contribute directly to the existence of project management standards that in their turn contribute to the project performance. However, in this research, we assume that an organization does not have to have a Project Management Office to implement a maturity model (Dai & Wells, 2004).

2.1.6 Relationship between PMOs and Project Management Maturity

The concept of maturing PMOs has only been recently developed and its related literature is limited. It was covered somehow with the PMO competency continuum created by Gerard Hill in 2004 (Hill, 2004). The maturity of the PMO contributed directly to the maturity of project management practices (Hill, 2004). Kendall and Rollins in 2003 also shared the same understanding of the importance of PMOs and their maturity when it comes of the maturity of project management practices; however the technique of how to measure the PMO maturity differs between the two, as explained in the following sub sections.

2.1.6.1 The Project Management Office Competency Continuum

Hill (2004) defines five stages of PMO capabilities that contribute directly to the maturity of project management practices within the PMO and also contribute to the strategic alignment with business objectives. The following figure (Figure. 1) summarizes those five stages:

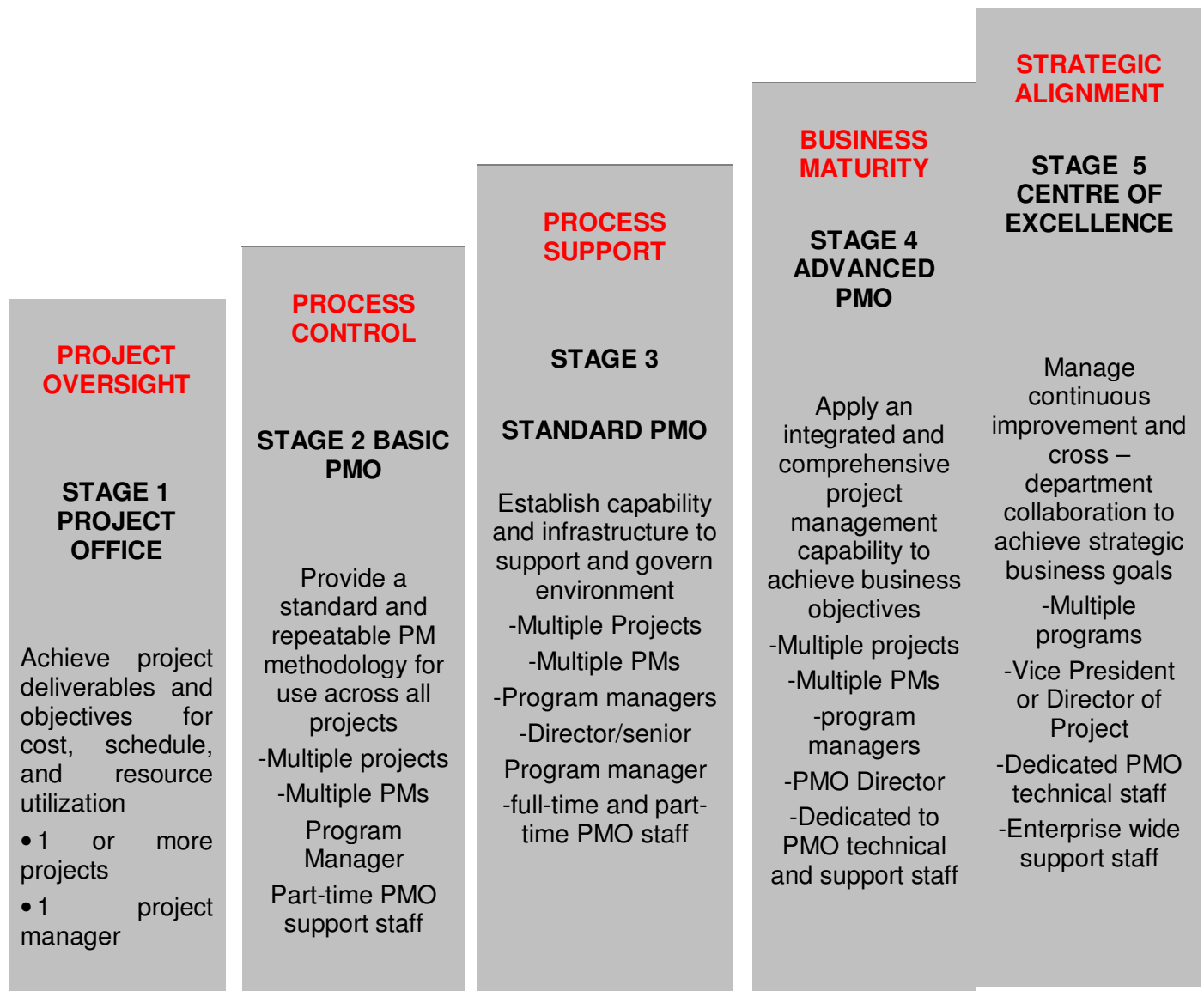


Figure 1: Five stages of PMO

(Hill, 2004, p.46)

2.1.6.2 Kendall and Rollins PMO Maturity Model

(Kendall & Rollins 2003, p.371-381) apply PMO maturity model to measure the PMO value using the Project Management Body of Knowledge (PMBOK) of Project Management Institute based Maturity model. The focus of their model is the PMO itself not only the best practices within it, where the nine knowledge areas are measured against a set of statements divided into eight levels of maturity:

- Level 1: PMO defining value
- Level 2: PMO organized
- Level 3: Searching for delivery value
- Level 4: Portfolio Management
- Level 5: Community buy-in
- Level 6: Project teams delivering on schedule
- Level 7: Project teams calibrated w/portfolios; more projects in fiscal year
- Level 8: Organization delivering

(Kendall & Rollins 2003, pp.371-381) explain clearly in their book (Advanced Project Portfolio Management and the PMO) how to move from one level to the next level and also a set of advises specific for each level.

2.2 Background of Project Management Maturity Models

Process maturity was first introduced in the Total Quality Management movement, where the technique of Statistical Process Control (SPC) was applied in a way that shows that improving the maturity of any technical process leads to the improving performance of that process (Cooke-Davies & Arzymanow, 2002).

Later between the years 1986 and 1993, the “Capability Maturity Model” for software organizations, was developed by the Software Engineering Institute of Carnegie-Mellon University. CMM changed the measure of performance from a process level to an organizational level, where it evaluates an organization's software process capabilities (Cooke-Davies & Arzymanow, 2002). This paper will cover the Capability Maturity Model in depth in a separate literature review section.

Cooke-Davies and Arzymanow stated that the concept of organizational project management maturity was derived from the software engineering processes, and thus applying the concept of maturity to software project management. Therefore, many project management maturity models came into view in the mid 90s and in the later years, such as “The Berkeley Project Management Processes Maturity Model”, PRINCE 2 maturity model, the "Organizational Project Management Maturity Model (OPM3)", The "Project Management Process Maturity (PM)2 model" and the "Portfolio, Programme and Project Management Maturity Model (P3M3)", which will all be discussed in the next chapters of this paper.

Other maturity models -that will not be discussed in this paper- include the following:

- The PM Solutions Project Management Maturity Model Kevin P. Grant and James S. Pennypacker
- The Project Management Maturity Model (ProMMM), David Hilson 2001.
- Kerzner Project Management Maturity Model (PMMM), Harold Kerzner 2005
- McCauley's Maturity Model, Hink's Information Technology and Process Maturity model, Microframe's Project Management Maturity Model, Fincher's Project Management Maturity Model, Dooley's New Product Development Maturity Model

2.2.1 Definition of Project Management Maturity Models

The Office of Government Commerce (OGC) defines a maturity model as a "systematic framework that provides a means for benchmarking and performance improvement, it can be applied to an organization, a business unit or a team to provide a road map for performance improvement". In general maturity models will include a set of descriptions of business performance divided into a number of maturity levels. For instance, some OGC models have 5 levels:

- Level 1 –"getting started, awareness, initial"
- Level 2 –"developing, focusing, repeatable, knowledge"
- Level 3 –"complying, practicing, competence, defined"
- Level 4 –"sustaining, exploiting, managed, excellence"
- Level 5 –"advocating, transforming, optimized"
- Level 0 may exist in some other models too – "unawareness." (OGC)

Most of the other models include 5 or 6 or even 8 levels of maturity, except for Project Management Institute (PMI) Organizational Project Management Maturity Model (OPM3), which relies on figures and percentages to show the results of maturity assessments for an organization when using *OPM3* Product Suite. (PMI OPM3 knowledge foundation)

2.2.2 Elements of Maturity Models:

Most of OGC's models consist of two elements of maturity models: the first element is the assessment of current maturity level either done internally or externally and the second element is the plan for performance improvement based on the assessment results to move up to higher levels of maturity.

While PMI's OPM3 consists of three elements: Knowledge, assessment and improvement. Knowledge includes an introduction to the *OPM3* model for the people who will be involved in applying the model either in PMOs or on higher levels. Assessment is the second step where it can be done using OPM3 online assessment (120 questions) or the full Product Suite assessment (1682 questions), which can only be conducted by a certified assessor. The improvement element includes putting the plan for improvement, conducting the improvement plan and redoing the assessment.

2.3 Portfolio, Program and Project Management Maturity Model (P3M3)

Portfolio, Program and Project Management Maturity Model (P3M3) is based on the best practices of project, program and portfolio set by the OGC and also follows the same approach of Carnegie-Melon Maturity Model. It was first introduced in the beginning of year 2006.

The main benefit behind this model is to improve portfolio, program and project management processes used in an organization. This model includes three sub-models and a self-assessment questionnaire, however OGC recommends to use an experienced assessor or (a Program and Project Management Registered Consultant) to get the best results (ogc.gov.uk & p3m3-officialsite.com, 2010).

The Model covers 3 sub-models, 5 maturity levels and 7 perspectives explained below:

The sub-models are the following:

- PfM3 – Portfolio Management Maturity Model
- PgM3 – Programme Management Maturity Model
- PjM3 – Project Management Maturity Model

The five levels of maturity defined in P3M3 are:

- Level 1: initial process
- Level 2: repeatable process
- Level 3: defined process
- Level 4: managed process
- Level 5: optimized process

The perspectives covered in the model are:

- Management control
- Benefits Management
- Financial Management

- Risk Management
- Organizational improvement
- Organization Governance
- Resource Management

OGC also recommends to use this model to identify weaknesses to obtain long term performance improvements, however the model allows organizations to obtain short-term performance improvements as well (ogc.gov.uk, 2010).

2.4 Prince 2 maturity model

PRINCE 2 is an acronym of (**PR**ojects **IN** **C**ontrolled **E**nvironments), and it is the standard used to manage projects effectively in most of the UK Government sector and also used commonly in the private sector. It was first created in 1989 by the Office of Government Commerce (OGC) previously called (the central computer and telecommunications agency) (PRINCE2.com, 2010).

PRINCE 2 Maturity Model (P2MM) was created based on PRINCE 2 standard to assess the maturity of organizations using this project management method. P2MM is derived from the Project Management Maturity Model (PjMM) which is one of the sub-models of the Portfolio, Programme and Project Management Maturity Model (P3M3). The model gives a clear view of the main practices in the project management processes that should exist in an organization in order for it to manage its projects effectively. Moreover, it recognizes the main practices that need to be applied in the organization in order to improve from one level of maturity to the next level. Another use of the model is to give a clear understanding of how to do the self-assessment using the questionnaire (p3m3-officialsite.com & ogc.gov.uk, 2010).

PRINCE 2 Maturity Model (P2MM) is only conducted by a PRINCE2 Registered Consultant. It comprises of 16 key process areas with a set of key practices for each. The maturity levels in this model are matching to P3M3:

- Level 1: initial process
- Level 2: repeatable process
- Level 3: defined process
- Level 4: managed process
- Level 5: optimized process (p3m3-officialsite.com)

2.5 The Berkeley Project Management Processes Maturity Model

C. William Ibbs and Dr. Young Hoon Kwak introduced the PM2 model is to help project managers justify investments of project management by delivering value out of projects. In order to do that, well set processes and methodologies need to be defined and continuously improved (Kwak & Ibbs, 2000).

Kwak and Ibbs compared and integrated different maturity models in 2000 to improve their own model (Berkeley's Project management Process Maturity (PM)2 model which they put in 1997. Some of the models they compared their model to were: Software Engineering Institute's Capability Maturity Model (CMM), McCauley's Maturity Model, Hink's Information Technology and Process Maturity model, Microframe's Project Management Maturity Model, Fincher's Project Management Maturity Model, Dooley's New Product Development Maturity Model. The paper also talked about the importance of benchmarking and Return on Investment study on projects (Kwak & Ibbs 2000).

The Berkeley Project Management Process Maturity (PM)2 Model is an efficient and organized approach to help organizations achieve higher project management maturity levels. The advantage of this model, identified by the authors is that it does not target specific audiences; it can be implemented for any organization applying project management processes and practices (Kwak & Ibbs 2000).

The model in 2000 included more features than the original model such as measuring financial effectiveness of project management, identifying relationships between project performance and project management effectiveness and project management return on investment calculation (Kwak & Ibbs 2000).

The model is structured into 5 levels of maturity (Likert Scale) where each level is broken down into the nine knowledge areas (Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk and Procurement) from the project management book of knowledge (PMBOK 1996) from PMI (kwak & Ibbs 2000).

Below, Table 1, Table 2 and Table 3 show the key project management processes under each level, major organizational characteristics under each level and the characteristics of the Berkeley PM2 model consecutively.

Table 1: Key Project Management Processes

MATURITY LEVEL	KEY PROJECT MANAGEMENT PROCESSES
LEVEL 5 (SUSTAINED STAGE)	Pm Processes Are Ceaselessly Ameliorated Pm Processes Are Amply Realized Pm Data Are Optimized And Affirmed
LEVEL 4 (INTEGRATED STAGE)	Multiple Project Management (Program Management) Pm Data And Processes Are Incorporated Pm Processes Data Are Quantitatively Examined, Evaluated, And Stored
LEVEL 3 (MANAGED STAGE)	Formal Project Planning And Control System Is Dealt with Formal Pm Data Are Managed
LEVEL 2 (DEFINED STAGE)	Informal Pm Processes Are Determined Informal Pm Problems Are Described Informal Pm Data Are Accumulated
LEVEL 1 (AD-HOC STAGE)	No Pm Processes Or Practices Are Systematically Available No Pm Data Are Systematically Collected Or assessed.

(Kwak & Ibbs, 2000, p.5)

Table 2: Major Organizational Characteristics

MATURITY LEVEL	Major Organizational Characteristics
LEVEL 5 (SUSTAINED STAGE)	Project-Driven Organization Dynamic, Energetic, And Fluid Organization Uninterrupted Movement Of Pm Processes And Practices
LEVEL 4 (INTEGRATED STAGE)	Strong Teamwork Formal Training For Project Team
LEVEL 3 (MANAGED STAGE)	Team Oriented (Medium) Informal Training Of Skills And Practices
LEVEL 2 (DEFINED STAGE)	Team Oriented (Weak) Organizations Have Intensities In Executing Standardized Function
LEVEL 1 (AD-HOC STAGE)	Functionally Secluded Lack Of Senior Management Support Project Success depends upon Individual Attempts

(Kwak & Ibbs, 2000, p.5)

Table 3: Characteristics Of The Berkeley (Pm)² Model

	INDUSTRIES/ ORGANIZATIONS	COLLECTED INFORMATION	GRAPHICAL PRESENTATION	DELIVERABLES	CONTRIBUTIONS
The Berkeley Project Management Process Maturity Model	Any Industry That Is Currently Practicing Project Management (I.E. Construction, Information Management & Movement, Information Systems, Manufacturing, Etc.)	9PM Knowledge Areas 5PM Processes Various Project Performance Data (I.E. Schedule And Cost Index, Etc.) Percentage Of PM Expenditure In The Organization Financial Data To Calculate Order Of Magnitude Return On Investment Of PM (PM /ROI)	5-Level Berkeley (PM) ² Model PM Maturity Vs. Project Performance Model PM/ROI Calculation Model	PM Maturity Assessment General Statistical Analysis Correlation Analysis Regression Analysis PM/ROI Calculation	Better Apprehension Of The Financial And Organizational Benefits Using PM Tools And Practices In Various Organizations Promote PM Practices And Processes As A Major Business Management Discipline

(Kwak & Ibbs, 2000, p.5)

2.6 Project management process maturity (PM)² model

An improvement to the Berkeley Project management process maturity model was introduced in 1997 and revisited in 2000 (Kwak & Ibbs 2000). The authors found out that the model was not detailed

and comprehensive enough and they also wanted to improve the model further more by adapting updated Project management practices and researches (Kwak & Ibbs 2002).

The following Figure (Figure 2.) shows how the improved model looks like:

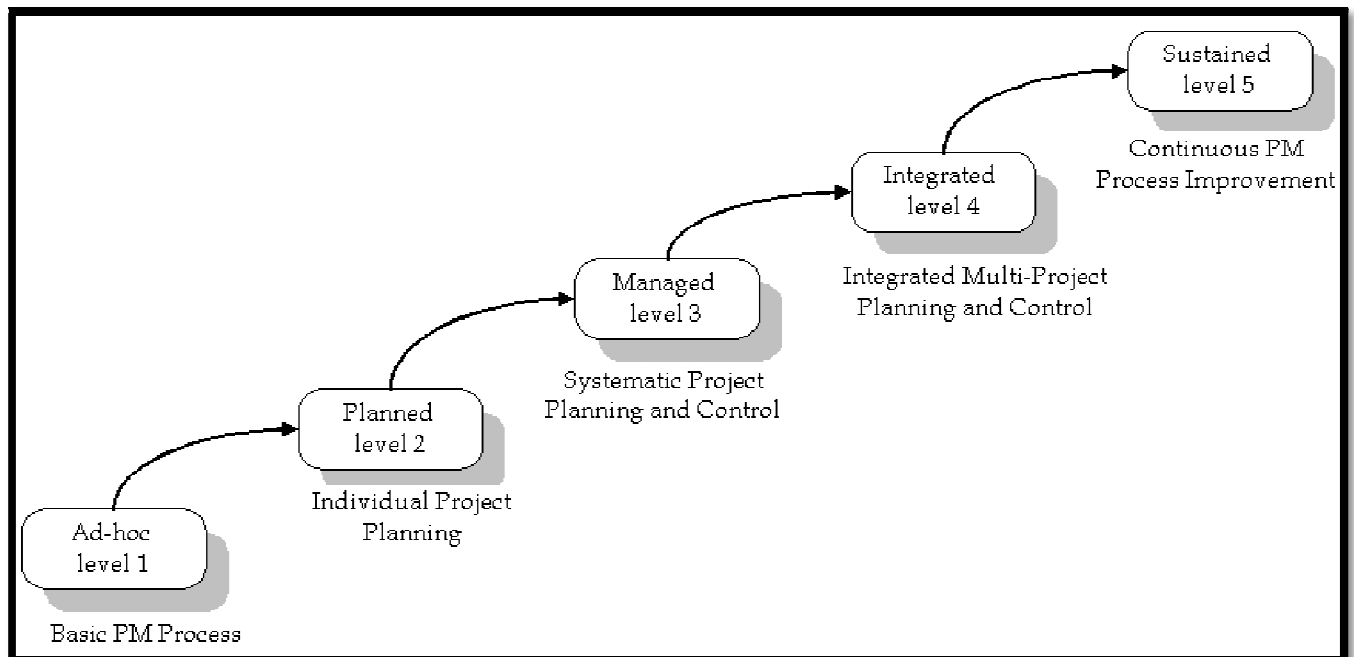


Figure 2: Levels of PM2

(Kwak and Ibbs, 2002, p.152)

2.7 Capability Maturity Model (CMM)

2.7.1 Background of CMMs

The Capability Maturity Model (CMM) was based on the principles of statistical quality control put together by Walter Shewhart in the 1930s. W. Edwards Deming, Joseph Juran and Philip Crosby improved Shewhart's principals further more (Chrissis, Levine, Shrum (2009). CMM focused on process improvement based on (Plan, Do, Check, Act or PDCA cycle) process improvement approach developed by Walter Shewhart (Mutafelija & Stromberg 2003).

Then the Software Engineering Institute (Carnegie Mellon University, Pittsburgh, USA) carried on broad exploration on improving the quality of the software development process based on those previous principals. As a result, the Capability Maturity Model for software (SW-CMM) was developed as a progressive standard to help an organization continuously improve its software processes (Kwak & Ibbs 2000).

More models were derived from the SW- CMM and they were targeted for other categories such as, systems engineering, software acquisition, human resource management, and integrated product and process development. Therefore, in general CMMs are sets of best practices used to improve organizations' performance (Chrissis, Levine & Shrum 2009).

2.8 CMMI

2.8.1 Background of CMMI

As we mentioned in the previous section, Software Capability Maturity Model was the basis of development of new CMM models in different categories. Creating such CMMs created many challenges for organizations. There was an increased cost and difficulty when one organization decided to adapt different CMMs; therefore it was difficult to improve in the same way across the same organization. The main reason behind such challenges is that the models had more differences than similarities, some of the differences were related to the structure of the model, the vocabulary used and they included conflicting parts with other CMMs. Moreover, many activities were repeated for each CMM used such as training, assessments and improvement steps (Chrissis, Levine & Shrum 2009).

The Software Engineering Institute decided to find a solution for the above challenges in 1997, by starting the CMM integration project, which was managed by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. The experiences of many experts from different organizations and CMM experts were utilized to create an improved and integrated model that will solve the issues of duplication of work and repetition (Chrissis, Levine & Shrum 2009).

As a result of the improvement project of CMM back in 1997, the developed CMMI still shared the same main objective of CMMs, which is to recognize best practices to improve business processes of organizations. Moreover, the developed CMMI included a set of integrated models covering three disciplines, which were software engineering, systems engineering and integrated product and process development. However, currently the CMMI Product Suite covers those three disciplines plus two more disciplines covering supplier management and acquisition (Chrissis, Levine & Shrum 2009).

2.8.2 Structure of CMMI Product Suite

The CMMI currently includes best practices in the disciplines mentioned before. These process areas are considered the main parts of the model. They are structured in a way that guides organizations into achieving improvements starting with an appraisal of the organization's maturity and process capability, then an establishment of priorities for improvement, and finally a plan to execute those improvements (www.sei.cmu.edu, 2010).

The CMMI Product Suite contains:

- CMMI models, appraisal methods and training material (www.Sei.cmu.edu, 2010).
- The CMMI models are: CMMI for acquisition, CMMI for Development and CMMI for services (www.Sei.cmu.edu, 2010).
- CMMI for development includes: Project Planning, Project Monitoring and Control, Supplier Agreement Management, Integrated Project Management, Risk Management, Quantitative Project Management (Wangenheim, da Silva, Buglione, Scheidt & Prikladnicki, 2010).
- Each CMMI model contains one or more disciplines (Chrissis, Levine & Shrum, 2009).
- Each CMMI model contains "required, expected, and informative" components (Chrissis, Levine & Shrum 2009).
- Every model is available in two model representations: "staged" and "continuous". Each organization can choose the best representation that works well with its requirements when implementing CMMI (Chrissis, Levine & Shrum, 2009). Each representation is more than 700 pages long (Mutafelija & Stromberg 2003).
- The difference between staged and continuous representations is related to how each one is structured. This means that the practices focus of each representation is different and the practices are organized differently. Continuous representation represents process improvement through 6 capability levels; however staged representation represents it through 5 maturity levels (Chrissis, Levine & Shrum, 2009) shown in Table 4 and Figure 3.
- Each process area in the continuous representation has defined goals that are implemented by defined practices where the summary elements are process areas and each organization can choose which single process area to focus on (Shrum, 1999).
- In the staged representation the organization can focus on process improvements one stage at a time, where the summary elements are the maturity models. So each maturity level includes a set of process areas that have to be covered fully in order to achieve that maturity model (Shrum, 1999).

- Chrissis, Levine & Shrum (2009) state that capability levels include sets of practices, when those are implemented, they improve the processes within the process area in which this capability level belongs to.
- Chrissis, Levine & Shrum (2009) state that each maturity level includes a set of goals that, when implemented, they improve processes that below to various other processes areas.

Table 4: Capability levels and maturity levels

<i>Level</i>	<i>Continuous representation: capability levels</i>	<i>Staged representation: maturity levels</i>
Level 0	Not performed	N/A
Level 1	Performed	Performed
Level 2	Managed	Managed
Level 3	Defined	Defined
Level 4	Quantitatively managed	Quantitatively managed
Level 5	Optimizing	Optimizing

(Chrissis, Levine & Shrum, 2009, online journal)

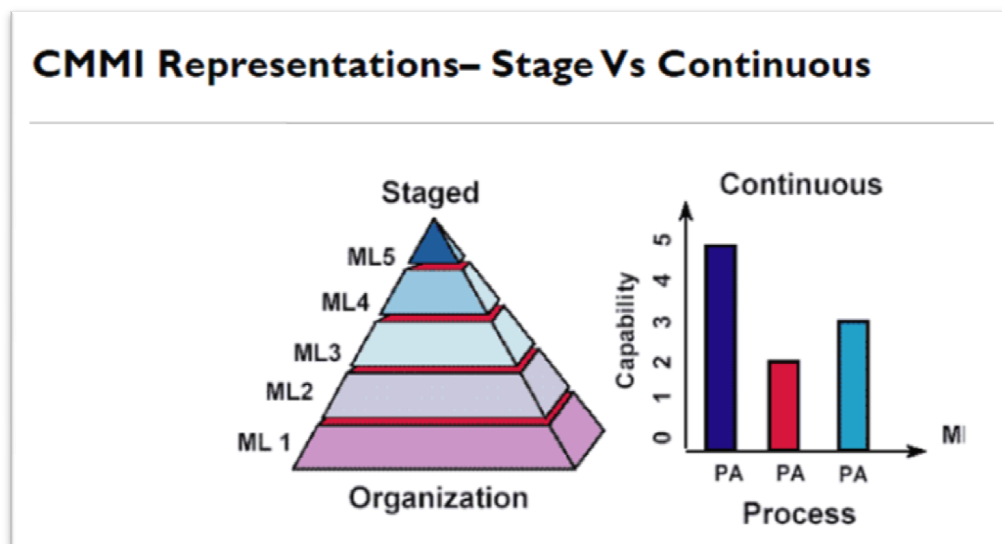


Figure 3: CMMI Representations- Stage Vs Continuous

(Dubai Municipality, CMMI Project Document, CMMI consulting presentation, 2011, p.6)

2.8.3 Types of CMMI appraisals

The Standard CMMI Appraisal Method for Process Improvement (SCAMPI) is the only appraisal method used for CMMI model, however this method is used in three ways or through three classes (A, B and C) (Mutafelija & Stromberg 2003). The following Table 5 extracted from SEI CMMI website, shows the major characteristics of those appraisal classes:

Table 5: Major characteristics of CMMI appraisal classes

Characteristic	Class A	Class B	Class C
Amount of objective evidence	High	Medium	Low
Ratings generated	Yes	No	No
Resource needs	High	Medium	Low
Team size	Large	Medium	Small

(Software Engineering Institute, 2011,
<http://www.sei.cmu.edu/cmml/tools/appraisals/classes.cfm>)

2.9 Organizational Project Management Maturity Model (OPM3)

2.9.1 History of *Organizational project management maturity model (OPM3)*

According to the second edition of the OPM3 Knowledge Foundation book, the project management institute identified in the year 1998 the need to have a project management maturity model of its own especially with the wide spread of Project management standard usage at that time. The development of such a model started with the creation of OPM3 program with team members with great knowledge of PMI standards. The program went through the following steps:

- Discovery phase and study of existing models including Carnegie- Mellon's CMM for software development model and other models using a set of questions and resulted in a research conclusion that there was no existing maturity model for Organizational project management.
- The team faced development challenges related to the analysis of the qualitative research more subject matter experts were added to the team to solve this problem.

- The collective 200 OPM3 volunteers who joined the team, working on identifying best practices. They first suggested 80 components which were reduced to 59 in September 2000. Eventually 170 best practices resulted from this step.
- In June 2001, 10 more teams worked on customer requirements and produced capabilities, outcomes and KPIs based on the best practices.
- In late 2002 the process model was developed that included the final number of best practices which was 586 best practices.
- Quality and alpha testing and beta testing of OPM3 in end of 2002 and early 2003.
- OPM3 was published in September 2003.

The second edition of OPM3 book of knowledge was released in 2008 and it was aligned to the Project Management Body of Knowledge (PMBOK Guide) - fourth edition, the Standard for Program Management- Second Edition and the Standard for Portfolio Management- Second Edition (OPM3 Knowledge Foundation, 2008).

2.9.2 What is *Organizational project management maturity model (OPM3)*

OPM3 stands for Organizational Project Management Maturity Model, which is a framework developed and adapted by Project Management Institute (PMI), that measures the degree to which an organization is practicing organizational project management. PMI defines Organizational Project Management as:

"The application of knowledge, skills, tools and techniques to organizational activities and project, program, and portfolios activities to achieve the aims of an organization through projects"

(Source: Project Management Institute, Organizational Project Management Maturity Model (OPM3) Knowledge Foundation (Second Edition), p.185)

OPM3 assesses organizations based on the above standards, for example, it takes into consideration the five process groups of Project Management (Initiating, Planning, Executing, Monitoring and Controlling, and Closing) in the assessment and improvement of an organization (Wangenheim, da Silva, Buglione, Scheidt & Prikladnicki, 2010).

PMI believes that the OPM3 can benefit the organization by bridging the gap between the strategy of the organization and the successful delivery of projects. OPM3 plays a great role in improving Portfolio, program and project management best practices which enables the delivery of successful projects on time and within allocated budget (OPM3 Online, Executive guide to OPM3 by PMI).

2.9.3 Elements of *Organizational project management maturity model (OPM3)*

OPM3 model includes three basic elements: Knowledge, Assessment and Improvement as shown in the figure (Figure 4) below. Each element plays an important role in achieving organizational maturity.

The Knowledge element is important to educate the organization about the definition of organizational project management, organizational project management maturity and the best practices that OPM3 is comprised of.

The assessment element gives the organization a clear idea of where it is in terms of organizational project management maturity and its current position in order to go forward.

The improvement elements comprise of the plan for improvement and the improvement actions according to the plan. This element helps organizations plan improvements based on the results of the assessment and take action to execute them in order to improve its maturity). The three elements are shown in Figure 4 Below:



Figure 4: Elements of OPM3: Knowledge, Assessment and Improvement

(Source: Project Management Institute, Organizational Project Management Maturity Model (OPM3) Knowledge Foundation (Second Edition), p.15)

2.9.4 Structure of *Organizational project management maturity model (OPM3)*

OPM3 is conducted using an online tool (Product Suite) that includes: forms to start assessments, database of best practices, and electronic version of OPM3 knowledge foundation book and improvement plans based on completed assessments (OPM3 Online, Executive guide to OPM3 by PMI).

The OPM3 Knowledge Foundation book is used as the first step of OPM3 process. It includes an explanation of how OPM3 should be conducted and the best practices related to it. Therefore, the second step is performing the assessment using OPM3 Product Suite, where the scope of the assessment is defined in the beginning and it can cover detailed assessment of best practices and capabilities of an organization. Moreover, PMI offers another way to perform the assessment, which is through an online self-assessment that gives organizations the chance to compare their current maturity status with the best practices in OPM3. The differences between the self-assessment and the Product Suite will be discussed later.

The third step is putting the plans to improve best practices and capabilities that were weak according to the performed assessment in order to get a higher maturity level. The improvement path is extracted from the Product Suite through a report. The fourth step is to execute the improvement plans to increase the organizational project management maturity level. And finally the fifth step is to redo the assessment again and go through the same process to determine if the improvements affected the maturity of the organization or not (OPM3 Online, Executive guide to OPM3 by PMI).

2.9.5 Types of *Organizational project management maturity model (OPM3)* assessments

The following table (Table 6) explains the major differences between OPM3 online self-assessment and the OPM3 Product Suite assessment (OPM3 Online, Executive guide to OPM3 by PMI) and (OPM3 Online, "OPM3® Online or OPM3® Product Suite A Comparison of Factors and Features", PMI 2007).

Table 6: Differences between OPM3 online self-assessment & OPM3 Product Suite assessment

OPM3 Online Self-Assessment Module	OPM3 Product Suite Assessment
Gives the organizations a chance to have a general idea of how they are performing in terms of organizational project management maturity. It	This assessment type is a detailed analysis of an organization's maturity level that requires to be performed using a software tool and a certified

<p>provides a taste of the current situation of the organization's maturity that can save time, human resources or financial resources to increase the maturity, if it is not needed.</p>	<p>assessor. This assessment approach costs much more than the self-assessment approach. However, it provides more accurate and detailed assessments data.</p>
<p>Benchmarking feature that provides organizations with reports of other organization's average results and reports of best practices achieved using OPM3 online assessments.</p>	<p>No benchmarking feature.</p>
<p>Performed online by any person in the organization using an account bought from PMI online. This person does not need a certificate.</p>	<p>Has to be performed using a certified PMI OPM3 assessor or a certified PMI OPM3 Consultant. And in order to use the Product Suite software, licenses have to be purchased.</p>
<p>No evidences required to prove that a best practice exists within an organization; therefore the maturity is based on "indication".</p>	<p>Based on evidences, which means that proofs that a best practice or a capability exists have to be shown to the assessor to get the score in order to get an accurate result.</p>
<p>Covers the best practices level only and can cover capabilities level but manually.</p>	<p>Covers best practice level, capability level, outcome level and KPI level.</p>
<p>Structured in questions of Yes/No choices only.</p>	<p>Includes Yes/no questions and "to which level" questions.</p> <p>Presents the results in two scoring techniques which are binary and OPM3 Product Suite, with point system to get full or partial scores on all the items.</p>
<p>120 questions that are fixed.</p>	<p>Total is 1640 questions; however this number can vary according to the assessment scope. Which means it is based on the domains used (project, program, portfolio and organizational enablers) and improvements stages used (standardize measure, control and continuously improve).</p>

Multiple assessments allowed, however the results are calculated manually.	Multiple assessments allowed where the results are calculated automatically through the tool by merging the assessments.
The improvement plan is optional and manual.	The improvement plan is an automated result from the Improvement Planning tool within the Product Suite. It is also optional however strongly recommended.
Assessment is applied manually to the strategy of the organization.	Strategy is connected to the assessment through the tool itself.

2.10 Applying a mixture of Maturity Models (OPM3 and CMMI)

Limited research was found regarding the usage of different maturity models together to achieve more benefit to the organization in a shorter period of time. Tim Keuten and Tim MacFadyen both with great experience in CMMI and OPM3 models, discuss the importance of both models to achieve higher levels of performances for organizations (Macfadyen & Keuten 2007).

Keuten and Macfadyen argue that OPM3 and CMMI complement each other. In other words, if an organization's goal is to achieve a specific CMMI level, it will benefit more from implementing OPM3 to guide it through project, program and portfolio management processes. The other way around when it comes to organizations implementing OPM3, they can benefit from CMMI when it comes to the technical details of software engineering that includes parts of software development life cycle which is not covered in that details in OPM3 (Macfadyen & Keuten 2007).

The recommended approach is to create a baseline based on initial assessments from one or both of these models to set the desired goals for the organization. However, not all organizations will benefit from using both models together, mostly large organizations dealing with project management and systems and software engineering will benefit more than small organizations that are dealing with specific customer requirements (Macfadyen & Keuten 2007).

2.11 Comparison between OPM3 and CMMI

The following table (Table 7) compares between PMI's (OPM3 and SEI's CMMI based on the above literature review.

Table 7: Comparison of OPM3 and CMMI

Maturity Model	Focus	Over lapping features	Distinct features	No. of maturity levels
CMMI	Process improvement focused	covers parts of project management when it comes to software engineering in the CMMI for Development and other CMMIs	Covers CMMI for services and CMMI for aquisition	Continuous representation: 6 capability levels Staged representation: 5 maturity levels
OPM3	Focuses on process improvement plus improving the organizational capabilities that support the process and how the process is used	Project management	Covers benchmarking feature in the online OPM3, program management and portfolio management and organizational enablers	The domains used (project, program, portfolio and organizational enablers) and improvements stages used (standardize, measure, control and continuously improve).

Moreover, a detailed comparison of assessment types of both OPM3 and CMMI is covered in the table (Table 8) below:

Table 8: A comparison of the assessment offerings for OPM3 and CMMI

Assessment Type	OPM3	CMMI
Entry Level <ul style="list-style-type: none"> • Short Duration • Minimal Resources • Low level of Rigor 	Self Assessment (SAM) <ul style="list-style-type: none"> • Comes with OPM3 standard • Shows approximate Organizational maturity on overall continuum • 151 binary (yes/ no) questions • Can be performed by anyone • No specific requirements 	SCAMPI C (OR arc Compliant Gas Analysis) <ul style="list-style-type: none"> • Organizations can evaluate whatever areas of risks are more important to them • Outputs show which areas of risk are most important to them • Conducted by as few as one appraiser • Only one piece of evidence (artifact or verbal affirmation through interview) is required

<p>Mid-Range</p> <ul style="list-style-type: none"> • More Effort • More Rigor 	<p><i>OPM3</i>^R ProductSuite Desk Assessment</p> <ul style="list-style-type: none"> • Requires Assessor to look at capabilities and outcomes with process owners • Shows approximate organizational maturity if rest of organization is following process • Must be performed by a PMI certified <i>OPM3</i> assessor • Requires evidence or testimony to demonstrate capabilities and outcomes 	<p>SCAMPI B</p> <ul style="list-style-type: none"> • Organizations can assess whatever areas of risk are most important to them but often focus on full coverage of a maturity level • Outputs show which areas of risk are most important to them • Must be conducted by a minimum of 2 team members and an authorized team leader • Multiple pieces of evidence (artifact or verbal affirmation through interview) are required
<p>SEI or PMI authorized rating</p> <ul style="list-style-type: none"> • Significant Effort • Significant Rigor 	<p><i>OPM3</i>^R ProductSuite Rigorous Assessment</p> <ul style="list-style-type: none"> • Requires assessor to look at capabilities and outcomes with process owners and practitioners • Results in a benchmark of organizational project management maturity • Must be performed by a PMI certified <i>OPM3</i> assessor • Requires multiple pieces of evidence or testimony to demonstrate capabilities and outcomes 	<p>SCAMPI A</p> <ul style="list-style-type: none"> • Organizations coverage of a maturity or capability-level • Must be conducted by a minimum of 4 team members and an authorized lead appraiser • Multiple pieces of evidence (artifact or verbal affirmation through interview) are required

(Keuten & MacFadyen, 2007, P. 3)

2.12 Case Study Background (Dubai Municipality)

2.12.1 Background about Dubai Municipality

Dubai Municipality was established in the late 1950s and it is one of the most influential government organizations in Dubai due to the big range of services it offers (around 600 services). It is also one of the largest organizations in Dubai since the number of employees reach to 16,000 employees. Dubai Municipality (referred to in the research paper with DM) serves customers ranging from individuals, private establishments and other government organizations. Therefore, the organization's hierarchy is organized into seven large sectors that are further divided into over 34 departments due to the large number of services.

Dubai Municipality's vision is:

"Creating an excellent city that provides the essence of success and comfort of living"

(Source: Dubai Municipality website:
http://login.dm.gov.ae/wps/portal/CommonPageEn?WCM_GL_OBAL_CONTEXT=/wps/wcm/connect/dmcontenten/Home/Common/VisionMission, 2011)

And the mission is:

"Working to plan, design, build and manage the municipal infrastructure and other related facilities and services through the appropriate investment in our human and other resources"

(Source: Dubai Municipality website:
http://login.dm.gov.ae/wps/portal/CommonPageEn?WCM_GL_OBAL_CONTEXT=/wps/wcm/connect/dmcontenten/Home/Common/VisionMission, 2011)

2.12.2 Background about Information Technology Department

The IT department (ITD) in organization A is a general support service department that provides services to both internal customers, represented by the organization's employees who are located in different locations in Dubai, and the external customers, represented by the citizens, residents of Dubai, and the business community.

The vision of the Information Technology Department is:

"To make Dubai Municipality the most efficient government organization in using information technology to accomplish its mission"

(Source: Dubai Municipality website:
<http://login.dm.gov.ae/wps/portal/DepartmentHomePageEn?>

WCM_GLOBAL_CONTEXT=/wps/wcm/connect/dmcontenten/
Home/DepartmentHomePages/7&deptid=DMDesign/7, 2011)

The mission of the Information Technology Department is to:

"Enable DM to implement information technology in its daily operations and activities in order to achieve proper planning, increased productivity, improved quality, increased revenue, satisfied customers and simplified work procedures"

(Source: Dubai Municipality website:
[http://login.dm.gov.ae/wps/portal/DepartmentHomePageEn?
WCM_GLOBAL_CONTEXT=/wps/wcm/connect/dmcontenten/
Home/DepartmentHomePages/7&deptid=DMDesign/7, 2011\)](http://login.dm.gov.ae/wps/portal/DepartmentHomePageEn?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/dmcontenten/Home/DepartmentHomePages/7&deptid=DMDesign/7, 2011))

The Information Technology Department holds many prestigious award and certifications one of them is the Excellent e-Government Department Award – as part of Dubai Program for the Excellent Government Performance which was won in the year 2007. In addition, the Information Technology Department is certified in ISO/IEC 27001:2005, which is related to the information systems security and certified in ISO/IEC 20000, which related to the quality of electronic services provided to customers. Both certificates obtained in the year 2010.

2.12.3 Background about Project Management in ITD

The Information Technology Department was executing projects since the day it was established. All of the projects are directly or indirectly related to automation of a business process for one or more of Dubai Municipality's department. Project Management activities were taking place randomly in different sections of the department. However, since the major software projects took place in the Application Development Section, only this section introduced a Project Management Methodology in March 2003 customized for its project managers. In addition, a virtual Project Management Office was established on the level of Application Development Section in the year 2005 and it offered guidance and a Project Management Methodology to the project managers of that section.

2.12.4 Background about ITD – PMO

In the beginning of the year 2008, the higher management in ITD decided that it was time to improve the existing project management methodology and force other sections to use it and at the same time establish a PMO on the level of the IT department. Therefore, a project was started (PMO initiative

project) that finally resulted in the creations of a new entity was established in the IT Department; Project Management Office (PMO) in the third quarter of year 2008.

The Initiative of ITD PMO included an assessment and gap analysis of the current project management practices in all ITD sections, which resulted in a set of recommendations which led to the improvement of the previous Management framework Methodology, introduction of the new Project Management Methodology to all ITD sections through a Project Management On the Job Training, creation of a PMO team on the level of ITD and finally the continuous management of projects within ITD based on the new methodology.

2.12.4.1 The Project Management Maturity Assessment Phase

The assessment was developed from many data gathering and investigation techniques (structured interviews with Project Managers, structured interviews with Project Sponsors and project documents and plans analysis). In addition, the design and structure of the interviews and project documents analysis was based on the Project Management Process Maturity Model (PM2) (Kwak and Ibbs, 2002) and other sources known to the consultant. However, questions of the interviews were customized so that respondents could have provided answers to questions related to certain knowledge areas of the Project Management Body of Knowledge (PMBOK).

The assessment of DM-ITD Project Management Maturity was conducted to establish the current level of maturity based on the Five Levels of PM2. The following table (Table 9) provides an overview of the five levels and their description that was extracted from the gap analysis report.

Table 9: PM2 Levels of Maturity as extracted from the gap analysis report

<u>Level of Maturity</u>	<u>Level Description</u>
Level 1 – “Ad Hoc”	No formal standards, processes, methods, procedures, or staff to constitute a project management discipline. Standard technologies and reporting are sporadic.
Level 2 – “Planned”	Project management standards, processes, methods, procedures, and staff exist in the organization, but are not considered to be an organizational standard. Basic documentation exists, inconsistent management support

	rarely/occasionally applied.
Level 3 – “Managed”	All project management standards, processes, methods, procedures, and staff are in place as organizational standards. Formal documentation exists, consistent management support, execution irregularly/inconsistently applied.
Level 4 – “Integrated”	More refined project management standards, processes, methods, procedures, and staff are in place. More refined documentation, consistent management support, consistent execution, and efficiency exist across all projects. Metrics are in place to collect performance data across all projects.
Level 5 – “Sustained”	Lessons learned and best practices are applied to continuously improve existing standards, processes, methods, procedures, and staff. Metrics are collected and applied at the project, portfolio, and organizational levels. The organization is in a position to evaluate future decisions based on past performance and maximize its competitive advantage in the industry.

(Source: Dubai Municipality, PMO Document (2008), Gap Analysis Report, p.14)

Based on the above table and the assessment of a sample of DM-ITD projects, the maturity level of DM-ITD was (Level 1-"Ad Hoc") in the beginning of the year 2008, where no formal standards, processes, methods or procedures constituted a project management discipline and project progress/status reporting was irregular. While the Application Development Section of DM-ITD was assessed as (Level 2 – “Planned”) where project management standards, processes, methods and procedures were established but basic documentation of project schedule and deliverables existed.

Therefore, a set of recommendations were put to achieve higher project management maturity in ITD some of them resulted in the following:

- Introduction of the new Project Management Methodology based on PMI's PMBOK 3rd edition and customize it according to DM environment
- Using the templates from the previous project management framework
- Offering Project Management On the Job Training based on the new methodology
- Creation of a PMO on the level of ITD to provide governance for projects.

2.12.4.2 ITD- PMO Vision

The vision of the PMO set in the year 2009 is:

"The vision of DM-ITD PMO is "to deliver successful DM-ITD projects on time, within budget by the correct people in a professional manner based on a standardized set of project management processes".

(Source: Dubai Municipality, PMO Document, ITD PMO Activities, 2009, p.4)

2.12.4.3 ITD- PMO Mission

The mission of the PMO set in the year 2009 is:

"To enable successful completion of projects and realize their benefits; while building Project Management maturity at the organizational level"

(Source: Dubai Municipality, PMO Document, ITD PMO Activities, 2009, p.4)

The mission of DM-ITD PMO is to provide project leaders and managers of DM-ITD sections with project management assistance in order to achieve quality project deliverables that meet planned schedules, budgets and documented functionalities. Hence, the PMO will define and implement common Project and Risk Management practices, tools and reporting mechanisms to achieve benefits out of projects. In addition, the PMO will also define and implement project management roles, responsibilities and organizational structure to move towards accountability and to strengthen project delivery capabilities through implementations of maturity models.

2.12.4.4 ITD- PMO Objectives

PMO objectives are set to support and achieve the mission statement of DM-ITD PMO. Such high level objectives are typically outcome-based and may specify the work required in a general way. While Sections within DM-ITD remain ultimately responsible for project success, DM-ITD PMO will be recognized as the ITD's authority on all issues related to Project Management and a center of excellence that embodies organizational best practices. Hence the following list presents the objectives for DM-ITD PMO:

1. Aligns the objectives of selected projects within DM-ITD to the strategic objectives and aims of DM. Hence, the DM-ITD PMO will help DM-ITD section heads to implement an ITD wide projects' prioritization mechanism to improve the accuracy and quality of project selection mechanism. This is done through the close integration between the PMO and the Portfolio Management Team.
2. Builds the Project Management Methodology based on PMI standard and updates it to account for improvements and best practices. Hence, as new or revised processes and templates are made available, the PMO deploys them consistently to the organization.
3. Establishes and deploys a standardized common set of project management processes and templates. These reusable project management components help projects start up more quickly and with less effort.
4. Facilitates improved project team communications by having common processes, deliverables, and terminology. Less misunderstanding and confusion occurs within the organization if everyone uses the same language and terminology for project-related work.
5. Establish a home base for project managers by creating a centralized office from which project managers can work across an enterprise. Coordinates with Head of Sections to constantly monitor their project managers and establish a mentoring home base for them in order to succeed in their projects.
6. Helps project managers to develop a proper Risk Management Plan to manage the identified risk factors by selecting the most appropriate plan or strategy to contain each risk factor.
7. Works closely with Quality Assurance office to implement consistent ITD wide quality standards for all Dubai Municipality technology products and services.
8. Provides training (internal or outsourced) to build core project management competencies and a common set of experiences.
9. Become internal consultants and mentors by advising project managers about best practices, through delivering project management coaching services.
10. Tracks basic information on the current status of all projects in the organization and provides project visibility to management in a common and consistent manner. Hence, the PMO will provide overall status and progress reports regarding the health of running projects and programs within DM-ITD portfolio.
11. Tracks DM-ITD-wide metrics on the state of project management, project delivery, and the value being provided to the business. The PMO also assesses the general project delivery environment on an ongoing basis to determine the improvements that needs to be made.

12. Acts as the overall advocate for project management to DM-ITD. This includes actively educating and selling managers and team members on the value gained through the use of consistent project management processes.
13. Helps DM-ITD top management to make the appropriate decisions regarding struggling projects, whether to continue funding such projects or to cancel them.
14. Maintains a pool of Project Managers that can be consulted whenever a project is selected for funding to appoint the most appropriate project managers.

2.12.4.5 ITD- PMO Functions

In order to meet the set of defined objectives, DM-ITD PMO must perform the following set of functions:

1. Establish and enforces a standardized and repeatable set of project management processes; including the deployment of Project Management templates
 - a. It is the responsibility of the PMO to make sure that all project management processes, activities and templates are clearly defined and available for DM-ITD project managers
 - b. PMO is responsible to periodically review and update project management processes, activities and templates
2. Assesses and improves DM-ITD's project management maturity regularly through the Organizational Project Management Maturity Model (OPM3)
3. Establishes and implements metrics that measure project and project manager performance
4. Offer Project Management Trainings and circulate project management knowledge:
5. Audits and reviews DM-ITD projects
6. Provides reports to DM Top Management (e.g. project status, training results)
7. Helps DM-ITD Project Managers with administrative details
8. Helps DM-ITD Project Managers with Risk evaluation and planning
9. Reviews and limits DM-ITD overall project risk portfolio

Risk management plan is one of the most important plans a project manager must develop within project planning phase in the project lifecycle. Risk responses should be reflected to the activities in project schedule.

10. Recognizes and rewards project management excellence: after a successful completion of a project, PMO sends congratulation as well a thank you email for the project manager and team members to DM-ITD members. PMO also encourages cooperation from project managers with

the PMO each month and send thank you emails to their head of sections, moreover, PMO notices the updates done on the Enterprise Project Management Tool by project managers and sends thank you notes to them monthly.

11. Acquires enterprise project management systems and tools: PMO is responsible for following up with current project management tools, and any new tool to be provided as soonest if required.
12. Facilitates effective communication in projects: As per the project organizational structure agreed with the head of DM-ITD; PMO is located between the project/program sponsor and the project manager to facilitate and communication in between regarding the whole case of projects.
13. Maintains project documents repository (Project Archive/History) in PMO library or in the Enterprise Project Management Tool.
14. Trains, mentors and certifies Project Managers within DM-ITD.
15. Provides guidance to DM-ITD project managers and teams

2.12.5 Reflection of Maturity Models in light of ITD – PMO

2.12.5.1 Past

Since the concept of maturity models is quite recent to organizations, Dubai Municipality's Information Technology Department did not recognize the need to measure the maturity of the project management processes implemented in the department before the year 2008. Many project management processes were implemented in the IT department since the year 2003, and just a few vendors argued the importance of conducting a CMMI assessment in the Information Technology Department, however no efforts took place in that field.

However, in order to implement best practices of the Information Technology Infrastructure Library (ITIL) framework managed by British Government's Office of Government Commerce (OGC), the higher management of the Information Technology Department requested a PinkScan™ assessment to be performed in September 2006 to report on maturity levels of ten IT Service Management Processes.

The objective of this process maturity assessment was to establish a foundation for process development and benchmark the current IT Service Management process maturity, in order to develop plans for process improvements initiatives. In addition, the goal was to help Dubai Municipality achieve ISO 20000 accreditation. This certification was achieved in the year 2010.

The PinkScan™ Assessment was carried out with a number of IT service support and delivery groups within Dubai Municipality Information technology department through survey questions and interviews. PinkScan used the Capability Maturity Model (CMM) as a guide for the five stages or maturity

levels of the assessment. However, the content of the assessment report was purely related to the ITIL best practice.

2.12.5.2 Present

From 2008 until the year 2011, the need to measure project management processes -in order to continuously improve them- emerged strongly. When the PMO initiative was first established, the consultancy company suggested measuring the current maturity level of the previously set project management standard. Moreover, the head of the information technology department wanted to find out what was the maturity level of each section in the department. There were no conflicting thoughts on which model to go with at that time, because the level of knowledge in the Information Technology Department when it came to maturity models was very low. Furthermore, the higher management found out that measuring value of projects output needed to implement mature project management best practices.

From the above sections describing the ITD PMO vision, mission, objectives and functions, the reader will find that project management maturity models were mentioned in the mission and in one of the functions, which is related to assessing ITD's project management maturity regularly through OPM3.

Since 2008 until the year 2010, two maturity assessments were implemented in the Information Technology Department through the PMO, the first one mentioned in the previous sections used the PM2 model at the initiation phase of the PMO and the second one used the OPM3 model in the Post Implementation phase of the PMO. The need for maturity assessments and maturity models was definitely initiated in the year 2008 and the need to know more about such models emerged as well.

2.12.5.3 Future

After the hands on experience resulted from the two maturity assessments done in the Information Technology Department, the knowledge about such models increased especially in the PMO and higher management. The strategy of the Project Management Office was modified by the Head of PMO (Heba AlShehhi) to include periodical Organizational Project Management Maturity Assessments and Improvement road map based on Organizational Project Management Maturity Model OPM3 from PMI. Based on those assessments, the future will involve creation of mature portfolio management methodology and program management methodology in the Information Technology Department. Moreover, many external companies and vendors are encouraging the department to conduct a CMMI appraisal for software development. In the near future a CMMI appraisal project will start in the

Application Development Section in the department. This section develops in-house applications and also outsourced applications using a software development life cycle, which is going to be measured through the CMMI for development model.

2.13 Summary of Chapter

This review of the literature leads to the following research propositions:

- P1. Mature organizations have better project performances*
- P2. Maturity models are needed in organizations in order to improve their projects, programs and effectiveness of the portfolios.*
- P3. Maturity models are focused on the current status of projects, programs and portfolio environment. Moreover, they do not provide a clear way to go forward from the current status to the future desired status.*
- P4. Organizational project management maturity model (OPM3) is only useful when project environments are using PMI standards for projects, programs and portfolios*
- P5. Organizational project management maturity model (OPM3) can be used in government organizations in Dubai and it fits the culture.*
- P6. A combination of other maturity models along with Organizational project management maturity model (OPM3) can suit government organization in Dubai more than Organizational project management maturity model (OPM3) alone*

To summarize the literature review charter, the researcher covered a detailed definition of Project Management Offices, their definitions in the literature, their roles in the organization, the different types of Project Management Offices, the responsibilities of PMOs, how Project Management Offices have an effect on project performance and finally discussed a couple of Project Management Offices Maturity Models.

The second part of this chapter covered a background about Project Management Maturity Models, how they are defined generally and general elements of such maturity models. The third part discussed one of the Office of Government Commerce maturity models which is Portfolio, Program and Project Management Maturity Model (P3M3). Other maturity models covered in the literature review are Prince 2 maturity model, The Berkeley Project Management Processes Maturity Model, and Project management process maturity (PM)2 model, which is an improvement of the previous Berkeley Project Management Processes Maturity Model.

The literature review covered in details two maturity models, one of them is the Software Engineering Institute's Capability Maturity Model (CMM), how it was developed and the challenges of implementation of CMM for organizations. Moreover, it covered how Capability Maturity Model Integrated (CMMI) was developed to overcome those challenges. The structure of CMMI Product Suite and types of CMMI appraisals are covered in this part as well.

The second maturity model that this literature review focused on is Project Management Institute's Organizational Project Management Maturity Model (OPM3), the literature explains the history of OPM3, how it was developed, how it is defined, elements of OPM3, structure of OPM3 and types of OPM3 assessments.

The researcher have found a few interesting articles that shows how to apply OPM3 and CMMI together and what are the benefits for an organization if it choses to do so. The next part compared OPM3 and CMMI together in terms of what each model focuses on, how they are structured and what are the similarities and differences between them.

Finally, the last part of the literature review gives a brief introduction to this dissertation's main case study by covering a background about Dubai Municipality, the Information Technology Department, the Information Technology Department Project Management Office and the past- present- future reflections of maturity models in the Information Technology Department.

3 Chapter Three: Research Methodology

3.1 Introduction to Chapter

The objectives of this research for this dissertation included studying different maturity models of project management, PMOs and processes, investigating the structures of PMOs, identifying the importance of maturity models, analyze the OPM3 case study, compare between OPM3 and CMMI, and recommend implementation requirements of maturity models and the requirements to successfully implement an OPM3 model. (See pages 4-5 in chapter one)

This chapter will discuss the methodology used to conduct this research and fulfill the objectives of the research, the methods of data collection including the primary research approach (case studies and expert interviews) and finally the secondary research methods.

3.2 Qualitative research approach

Qualitative research approach was adopted for this research because unlike quantitative research approach, qualitative research depends on the researcher's "subjective perception" as evidence to the research. Furthermore, the qualitative research approach has many features such as, the analysis of day to day events, expression of the researcher's competencies, reflecting the perspectives of the participants in the research through observation and case study analysis. (Flick, Kardorff & Steinke, 2004)

3.3 Methods of data collection

The qualitative research approach includes many data collection methods. The methods of collection for the verbal data include interview and focus groups. Analysis, interpretation and presentation are the means recognized for analysis of interview data. (Flick, Kardorff & Steinke, 2004)

In addition to that one of the methods of data collection and investigation is the case study method. It is a qualitative approach of inquiry into a single case. (Stake, 1995)

In this research, the primary research methods that were used for analysis and data collection, were case studies through direct participant observation, open interviews and expert interviews most of which were done retrospectively.

3.3.1 Primary Research

3.3.1.1 Case study:

Case study research approach is defined by Denscombe (2007) as an approach that **"focuses on one instance of the thing that is to be investigated. The aim is illuminate the general by looking at the particular"**. Denscombe sees case studies as a means to provide in-depth or detailed analysis of an event or an experience. Case studies are chosen as an approach to qualitative research based on a strategic decision that is related directly to the scope of the research and its scale. (Denscombe, 2007)

The characteristics of case study method include the following: (Denscombe, 2007)

- 1- In-depth study of events and circumstances
- 2- Studying the particular instead of the general
- 3- Study of the relationships and processes instead of the outcomes
- 4- Coverage of the holistic view
- 5- Looking into many sources instead of one research method.

The case study of OPM3 was chosen for this research because it is directly linked to the subject of this research paper and the researcher was involved in that event. Denscombe (2007) explains below how the researcher can choose the relevancy of case studies chosen for a research.

"The case study approach generally calls for the researcher to make choices from among a number of possible events, people, organizations, etc. The researcher needs to pick out one example (or just a few) from a wider range of examples of the class of thing that is being investigated"

(Source: The Good Research Guide, Martyn Denscombe, third edition, 2007, p.39)

The basis for the case study and case study background was written as a result of direct involvement of the researcher in the Information Technology Department Project Management Office, formal and informal meetings with Information Technology Department higher management, conversations with colleagues and informal interviews. Additionally, data was collected from PMO documents, experts' interviews, the researcher's direct engagement in OPM3 and CMMI related activities Dubai Municipality ITD. Therefore, the approach used for this case study is based on the participant's observation and project manager's reflections.

Moreover, the methods of analysis of the case study included a retrospective analysis of the situation by the researcher based on the events that happened after the period of the OPM3 assessment such as the engagement with other PMO projects in ITD in the years 2010 -2011 and the researcher's participation in one of PMI's conferences during the year 2011.

3.3.1.2 Semi structured interviews

Interviews emphasize the researcher's skills in managing a conversation, under a set of assumptions and a full understanding of the current event. (Denscombe, 2007)

An agenda needs to be set before starting an interview. In the semi structured type of interviews, the interviewer has a clear idea of the questions and topics to be covered in the interview. However, the interviewer can have the flexibility in terms of shaping up the questions, change the order of the topics covered and elaborate on the important aspects of the interview. The answers in the semi structured interview type are open ended answers. On the other hand, the unstructured interview type opens up the door for the interviewee to develop their own ideas under the introduced topics or issue by the interviewer. (Denscombe, 2007)

In this research experts in OPM3 and CMMI were interviewed in semi structured interviews under the following agenda or topics:

- 1- Organizational Project Management Maturity Model (OPM3):
 - a. OPM3 Benefits to the organization
 - b. OPM3's role in achievement of strategy
 - c. OPM3 weaknesses
 - d. Differences between OPM3 and CMMI
 - e. OPM3 case study in Dubai Municipality difficulties
 - f. Recommendations for organizations seeking implementation of maturity models in project management
 - g. What is next for organizations that reached to the highest level of maturity (100%)
 - h. Possibility of merging maturity models together

- 2- Capability Maturity Model Integrated (CMMI):
 - a. CMMI Benefits to the organization
 - b. CMMI's role in achievement of strategy
 - c. CMMI weaknesses

- d. Recommendations for organizations seeking implementation of maturity models in project management
- e. What is next for organizations that reached to the highest level of maturity (Level 5)
- f. Differences between OPM3 and CMMI
- g. Possibility of merging maturity models together

In the semi structured approach, the researcher based the questions of the interviews on the literature review and the researcher's past experiences. Moreover, some of the questions in the second interview related to CMMI, on the issues and questions surfaced during the first interview related to OPM3.

The method of analysis of the interviews included elaborating on the questions and answers during the interviews and interpreting the answers using the researcher's understanding of the answers. This was enabled by recording the interviews to go through them later and taking notes during the interviews. Appendix A includes a sample interview transcript, for more interview transcripts, please contact the author.

3.3.2 Secondary Research

Secondary research method in this research incorporated the peer reviewed articles, journals, electronic books accessed online through the internet. In addition to that the internal sources to the Information Technology Department in Dubai Municipality were a major input to the secondary research method such as project documents, gap analysis reports, assessment reports, interviews with executives and peer to peer interviews and other sources that the researcher had access to due to the direct involvement in assessment projects and the PMO.

3.3.3 Limitations of the research methodology:

The research found the following limitations of the research methodologies used:

1. Collection of case study information and data for this research happened almost a year after the event that triggered the case study, which could have led to inaccuracy and incompleteness of information extracted from the case study comments and experts interviews.
2. In the experts' interviews, the researcher had to depend on other people's memory in answering the questions of the interview.

3. Finding experts in OPM3 and CMMI to interview was a difficult task and it depended on the availability of those experts.
4. CMMI is focused on processes that are different in scope than OPM3; however they overlap in some of the processes of project management. But CMMI does not go into details of project management compared to OPM3.
5. Depending on only one case study shows only one example of how OPM3 was implemented in a government organization in Dubai. More examples are needed, however some of the limited number of organizations who implemented OPM3 in the UAE are sensitive organizations that would not share such information with the researcher.
6. Since CMMI is huge in nature and covers many extensive processes, experts in that field may not find the interest to know more about OPM3 model since the focus of OPM3 is hardly related to CMMI. But this interest may increase in case an OPM3 assessment was done for the same client that will perform a CMMI assessment.
- 7.

4 Chapter Four: Analysis and Results

4.1 Case study 1 data:

4.1.1 ITD PMO- OPM3 assessment

As mentioned in the case study background section, the ITD PMO was established as a result of the PMO Initiative Project, which started with an assessment and gap analysis of the current Project Management processes and practices in ITD back in the year 2008 done by an outsourced consultant. The PMO Initiative project was led and managed by the same consultant over a period of almost a year.

In order to close the project and assess the achievements of the outsourced company, a post implementation assessment was supposed to be done by the same consultant after a year and a half as part of the contract.

However, the higher management of ITD preferred to have an objective assessment done by an external assessor to make sure that the assessment was unbiased and the results were accurate; therefore OPM3 assessment came into place. OPM3 was the best choice at that time, because the new methodology was based on PMBOK guide.

Organizational Project Management Maturity Model was introduced to the PMO by the OPM3 consultant, certified assessor and practitioner (Lotfy Sabry, Managing Director, Experts Project Management Co.). OPM3 Product Suite assessment for Dubai Municipality was completed by September 2009 to a scope agreed with the newly appointed Head of Project Management Office in the IT Department at that time (Heba AlShehhi, Information Technology Department, Dubai Municipality).

4.1.1.1 Objectives

The OPM3 model that was implemented for ITD Dubai Municipality covered and achieved the following objectives:

1. Assessing the PMO Initiative project achievements and closing the project.
2. Sharing the knowledge about OPM3 through one full day of OPM3 knowledge training conducted by the OPM3 consultant and assessor to a team comprised from different sections from ITD.
3. Assessing the current maturity level of Project Management practices used in different sections' projects in the IT department through the new PMO.
4. Assessing the current maturity level of Program and Portfolio Management informal practices in ITD, although they were not part of the scope of the new PMO.

4.1.1.2 Scope

The scope of the assessment was to cover the Project/ Program/ Portfolio domains and the Standardize/ Measure/ Control/ Improve Stages for the ITD- PMO only, plus it covered an assessment of the organizational enablers for DM ITD.

The OPM3 Product Suite assessment methodology and tool employed the PMI's OPM3 maturity model, which was done by the certified consultant Lotfy Sabry. The result of the assessment was a detailed analysis of the current ITD's Organizational Project Management Maturity.

The scope was limited to the Information Technology Department, therefore, a few of the organizational enablers were defined as inapplicable as they were related to other departments such as Human Resource Department.

4.1.1.3 Challenges

A few challenges faced the OPM3 assessment team before and during the OPM3 assessment some of them were:

- 1- The lack of centralization of project documentations needed as evidence of use in the assessment. Some documents were on the Microsoft Enterprise Project Management tool (EPM), some documents resided in the PMO folders, others were scattered with project managers.
- 2- The consultant believed that one of the major challenges was the lack of experience of the new Head of PMO (Heba AlShehhi) in terms of project documentations and the new project management methodology.
- 3- The time limitation for performing the assessment (two weeks were originally designated for the period of assessment, however the assessment took around 4 to 5 weeks)
- 4- The big number of best practices and capability questions the team had to cover and find evidences for.
- 5- Hesitation from the project managers to cooperate with the process of collecting evidences because of the doubts that such an assessment would assess their personal capabilities as project managers.
- 6- The unfamiliarity of the head of PMO and the assessment team with the Program management standard and the Portfolio Management Standard from PMI, in spite of the informal practices that existed minimally in both areas in ITD.

4.1.1.4 Results of the assessment

- ❖ The ITD PMO initiative focused for a whole year on documenting the new processes based on PMBOK (3rd edition), communicating them and encouraging project managers to practice them. In OPM3 language this phase of process improvement is called STANDARDIZE, where ITD achieved 71% in the OPM3 Product Suite scoring. The OPM3 assessor thought that this percentage was impressive, however the PMO assessment team expected a similar results since project management methodology was in place since 2003 and the new PMO updated it and activated it further.
- ❖ DM-ITD-PMO has achieved an overall OPM3 maturity of 9%, which covered project management, program management, portfolio management and organizational enablers.
- ❖ The maturity per each domain and all levels (standardize measure, control, and continuously improve) was 18% for project management, 0% for program management, 0% for portfolio management.
- ❖ The maturity level for Organizational Enablers (such as PM training, management sponsorship, organization strategy, etc) was 18%.
- ❖ Many unofficial observations resulted from OPM3 assessment including the lack of portfolio management and program management standards. Therefore, the PMO implemented Microsoft Project Portfolio Management and upgraded the current version of Enterprise Project Management tool to 2010). In which a portfolio management process is set up based on PMI.
- ❖ The other observation was regarding the difficulty of accessing the project management methodology and the templates. Therefore, the PMO purchased –in early 2011- a readymade project management methodology package that included an easy flow of processes based on PMBOK fourth edition and updated templates.

4.1.2 OPM3 Consultant recommendations to ITD PMO

The OPM3 consultant and assessor gave the head of ITD PMO a few recommendations after the assessment some of them are as follows:

- ❖ An improvement road map needs to be developed in order to best use the results of both assessments to the benefit of the PMO.
- ❖ OPM3 is not just an assessment framework. ITD need to use the same framework for assessment and improvement to increase the probability of achieving higher score next time.
- ❖ Adding more resources to the PMO could have helped in speeding up the assessment phase.

- ❖ Having an experienced head of PMO could have also helped in speeding up the assessment phase, since an experienced head of PMO would have known the location of project documentation and knowledge of internal project managers practices.

4.2 Semi structured interviews

4.2.1 Expert Interview One- OPM3 certified assessor and practitioner (Lotfy Sabry, Managing Director, Experts Project Management Co.):

Answers to the topics of the interview related to the Organizational Project Management Maturity Model (OPM3) are summarized as follows:

- a. The interviewer asked the OPM3 expert about the main benefits OPM3 brings to the organization and what is the role OPM3 plays in achieving the strategy of the organization:*

The OPM3 consultant believed that the most important benefit of OPM3 to the organization is how it can help it "achieve its strategy successfully".

He explained more by giving a background about organizational project management. He stated that project management skills were transformed from being "soft skills" of project managers to "organizational skills or competencies" that help an organization achieves each strategic objective. Therefore, Organizational Project management was introduced and linked to the organization.

Moreover, he mentioned that PMI introduced OPM3 based on all three standards of PMI (portfolio, program and project), which enabled companies to use the right tools, skill sets and knowledge in the three domains of portfolio, program and projects to achieve their strategy. Where the most important domain is the portfolio management which is directly linked to the strategy and gives a clear idea of the steps needed to achieve it.

When the interviewer asked about the way to measure the achievement of strategy, the expert stated that this is done through comparing the practices within the organization with the best practices in the OPM3 model through an assessment to find out the gap that needs to be filled.

- b. The interviewer mentioned some of OPM3's weaknesses such as the inflexibility of the model and the big number of questions, the OPM3 expert replied to that as follows:*

The OPM3 consultant believed that such weaknesses are perceived by people because of the lack of knowledge and experience of OPM3. He believed that OPM3 is considered a "multi dimensional" model instead of "prescriptive" model like the CMMI. In his opinion, the prescriptive model includes levels from 0 to 5, each level has "prerequisites", in order to reach to one level an organization has to comply to all of those prerequisites, which is "not flexible to the organization". However, he stated that in OPM3 each organization can scope based on their requirements. Although OPM3 includes 1682 questions, they are not all required to the organization. The first step of the assessment includes scoping the requirement for an organization by defining the targeted domains and stages and "this is not available in CMMI".

c. The interviewer asked the OPM3 expert about the main difficulties that he faced during the OPM3 assessment in Dubai Municipality:

The OPM3 consultant was the same assessor who conducted the OPM3 assessment for Dubai Municipality in 2009, when asked he mentioned in the interview that he faced a few difficulties during the assessment period; some of them in his opinion were as follows:

- ❖ Access to information, since at that time the head of PMO was newly appointed and "lacked the knowledge of project documentation location", the correctness of the documentation and how they were stored. Therefore, the assessment period took three weeks more than the original estimation (two weeks).
- ❖ Lack of resources in the PMO; there was a lot of learning to be done and searching for evidences and this slowed down the process as well.
- ❖ Best practices (related to portfolio management) were "scattered" between different organizational units, and "there was no proper organizational unit governing the processes".

d. The researcher asked the OPM3 expert about his recommendations for organizations seeking implementation of maturity models in project management

During the interview the consultant gave Dubai Municipality and other similar organizations advices and recommendations, they were as follows:

- ❖ Dubai Municipality has to continue with the full cycle of OPM3 improvement planning and the improvement implementation and assessment again.
 - ❖ The assessment has to be done at least one to two times per year to make sure that an organization is always complying with best practices.
 - ❖ "Assessing one time only has no value".
 - ❖ Justifying budget spent on OPM3 lies in the "intangible benefits OPM3 brings to organizations, which is the achievement of strategy". Therefore, organizations have to be patient in order to see actual results of improvements over the years based on OPM3 model. For example, one of his clients in Qatar took around two years in the project management domain and the standardize stage, to reach from 1% then 11% then finally 90%.
 - ❖ "Project Management Maturity is how the company is practicing project management". Therefore, before an organization decides to measure maturity, it has to practice project management. And in order to practice project management it has to consider the "four pillars of project management, which are people, process, technology and organization". "The most important pillar is the people side that includes project management training, creating the culture, process methodology training, and training on the tools" that automate the processes that are aligned with best practices. Once all of this is in place, then an organization can consider maturity models, which makes maturity as an advanced stage for an organization.
- e. *The interviewer was curious to know what is next for an organization that reached to 100% of improvement in OPM3 assessment, covering all domains and the full scope, the answer was as follows:*

The consultant believed that it would be very difficult for an organization to reach to 100% in all domains (project, program, portfolio and organizational enablers) and across all stages (standardize, measure, control and continuously improve). However, "assuming an organization reached to 100%, the next step would be to always make sure that the maturity level go down to less than 100% again". And also make sure that every four years, the organization links their current best practices with the updated best practices that are released by PMI in new standards every four years.

- f. *The researcher enquired about the possibility of merging maturity models together in the field of project management. The OPM3 expert answered in the following way:*

The interviewee believed that it is possible to merge two different maturity models for different application area but not for the same area. For example, he did not recommend assessing project management using two different maturity models, because in his opinion "this would be a waste of time and efforts and the results will be inaccurate". This is because each maturity model has its own prerequisites and in order to meet them, a lot of effort has to be done in order to collect the needed evidences and documentation.

He stated that CMM has few project management processes and few procurement processes; there are no processes for portfolio management or program management or organizational enablers. "Therefore, OPM3 is much more comprehensive than CMM".

Moreover, he believed that CMM can be used for software product development along with OPM3 for project management processes. "But it would be very important to remove the overlapping between them by ranking the processes that are already covered in CMMI as not applicable in OPM3 and take them out of the scope of the assessment. In this way, an organization can avoid redundancy and will get honest results in both models".

4.2.2 Expert Interview Two- CMMI certified assessor and practitioner (P J Corum, Quality Assurance Institute Middle East FZ. LLC.):

Answers to the topics of the interview related to the Capability Maturity Model Integrated (CMMI) are summarized as follows:

- a. *The interviewer asked the CMMI expert about the main benefits CMMI brings to the organization and what is the role CMMI plays in achieving the strategy of the organization:*

The CMMI expert believed that CMMI improves the quality of the processes through achieving the benefits that fall under two categories (business benefits and people benefits):

1. The "practical business benefits", where the business becomes "cheaper, better, faster". The goal of CMMI is to remove the waste from the processes, making them more effective and efficient. This will reduce the time from "concept" to "cash flow". If a company can reduce the cost by improving the process, it will start making more money faster. Therefore, with good

process improvement, the "time to market" will be reduced along with the cost, and therefore, profit will increase and total cost of ownership will be reduced.

2. The "People benefits" include removing the "chaos in the process, training people on repeated and measured processes and improving people's performance". In that way, employees' morale will improve. In his opinion, one of the biggest benefits is "happier employees". They will be happy because of their clear knowledge of their roles, responsibilities, authorities and the processes they follow and their ability to prove that "they did a good job".

He also stated that the above benefits can be achieved through the following:

- "Gaining insight into an organization's capabilities by identifying the strengths and weaknesses of its current processes, relating those strengths and weaknesses to the CMMI reference model, prioritizing improvement plans through focusing on improvements by correcting weaknesses that can cause risks, obtaining capability and maturity levels' ratings, and identifying development or acquisition risks relative to capability or maturity determinations".
- "Determining how well the organization's processes compared to CMMI best practices and identifying areas where improvement can be made".
- "Informing external customers and suppliers of the level of maturity of the organization's processes compared to CMMI best practices" (The ability to bench mark neutrally against the best).
- "Meeting contractual requirements of one or more customers".

b. The CMMI expert replies to the correctness of statements related to CMMI weaknesses introduced by the researcher were as follows:

1- Statement 1: CMMI is too big and complex:

- CMMI book is large with over 735 pages; it is divided into three parts CMMI for development, CMMI for acquisition and CMMI for services. "However, a lot of the core processes are common to all three parts". "For example Project management is consistent in all three boards". For example, "CMMI for services really expands on configuration management and release management".
- But it is broken down depending on the level the company wants to achieve because each level has a specific number of best practices.
- Only the appraisal team will know about all the targeted best practices through training. The other employees will get an awareness session.

2- Statement 2: CMMI appraisal takes a long time

- The process includes a three days introduction training to CMMI appraisal to the internal team who will do the appraisal from the organization itself. Then there are three levels of SCAMPI appraisals, C which is the simple "baseline appraisal", B is optional and it is considered as an "insurance policy" and A is the "rigorous and full appraisal" and it takes two weeks.
- The whole process could take up to 12 to 18 months from start to finish, but most of the time includes the improvement of the processes by the company itself against the level it wants to achieve.
- It also depends on the scope the company decides on (what level it wants to achieve), the number of employees that are assigned to the process improvement and CMMI model and how fast each process can be improved.

3- Statement 3: CMMI is only for large organizations

- "No, CMMI appraisals were done for companies that do not have IT". As long as a company wants to improve its processes, there is no difference if it is big or small.

4- Statement 4: CMMI is difficult to scope down, meaning an organization can't choose what scope to cover in each CMMI appraisal, they have to go through all questions.

- "Not true, because in the continuous model, the organization can choose what processes to improve and what level it wants to achieve for those processes".
- In terms of project management, there are three process areas that cover project management, "from fundamental to integrated project management". "It references PRINCE 2 but it doesn't go into details of project management. For example it asks for evidences of project planning and risk planning".
- CMMI does not cover processes related to portfolio that directly links projects to an organization's strategy.

c. *The researcher asked the CMMI expert about his recommendations for organizations seeking implementation of maturity models in project management, his replies were as summarized in the points below:*

- "A business decision has to be taken to decide how good an organization wants to be", would level 2 or 3 or 4 be sufficient or not. And that depends of the type of business of the organization. "For example, NASA needs to be Level 5, because the business is critical and failures are brutal".
 - Decide on which representation to use, staged or continuous.
 - "Define the vision and mission and goals" of following CMMI model or any other model because there is a cost involved in implementing any model and "return on investment" should also be considered.
 - Management support is important for a successful implementation of CMMI.
- d. *The interviewer was curious to know what is next for an organization that reached to highest level of maturity (Level 5) in CMMI appraisal, the answer was as follows:*

"There is no end to improving the processes of an organization; the reason is that the business is always changing. And as the business changes, we have to change our processes to accommodate with the change; otherwise the company will go out of business". Every two years there is an update in CMMI editions. And every three years there has to be a mandatory check if an organization is still on the same level or not in order to sustain the certification.

- e. *The interviewer brought up the topic of main differences between OPM3 (multi dimensional approach) and CMMI (prescriptive approach):*

Based on the first interview with the OPM3 expert, the interviewer explained to the CMMI expert what the OPM3 expert meant with multi dimensional and prescriptive approaches of maturity models and the CMMI experts answers were as follows:

- In terms of the prescriptive approach, the CMMI expert denied that this statement was true. He disagreed with the statement that CMMI follows a series of specific steps because "it is not a "canned approach, it's an intellectual exercise to apply to the facts and collect evidences for a particular practice". However, he stated that the OPM3 expert may have been talking about the staged representation without taking into consideration the continuous representation.

- CMMI covers processes in a horizontal way without going into deep vertical approach with project management, therefore, he agreed that OPM3 is much more focused and goes in depth than CMMI when it came to project management.
 - The CMMI expert was curious to know how OPM3 compared itself to Prince2 and whether OPM3 have an equivalent of SCAMPI A appraisal method.
 - The difference between CMMI and OPM3 is the scope, for example, "CMMI has 24 process areas one of them is project management, but OPM3 focuses on project management as a main area".
- f. *The researcher enquired about the possibility of merging maturity models together with the CMMI model. The CMMI expert answers are below:*

He stated that there is research proving that CMMI for services can be used along with ISO 20000 to prove that it is in compliance. The CMMI expert mixed COBIT and CMMI maturity levels for one of his customers. He usually mixes maturity models that he is certified in and chooses the best practices from different models.

For project management assessment, he believed that CMMI can be used through continuous model focusing on project management process area; however the processes may overlap between CMMI and OPM3. He recommended that if a customer wants deep assessment of project management, then OPM3 will suit the customer more.

He agreed with the OPM3 expert that if there were any repeated processes, in CMMI they can be categorized under "alternate procedure or alternate process". And if both assessments (OPM3 and CMMI) were done at the same time, then the evidences collected should not be repeated to avoid waste of time.

4.3 Summary of chapter

The above chapter targets the representation of the data collected by the researcher through the case study and the semi structured interviews which were the primary research data.

In the case study section, the main goal behind that section of the chapter is to list the facts and events that happened during the OPM3 assessment phase that was managed by the PMO of the IT department in Dubai Municipality. Some of these facts were the objectives of the assessment, the scope

of the assessment and the timeframe, and the results of the assessment. Moreover, this section includes the events that were represented as challenges to the assessment and also the results of the assessment.

What's more, the section lists a few recommendations from the OPM3 consultant and assessor after the period of the assessment that were given to the head of PMO and the assessment team.

The second major primary source of data was the semi structured interviews with the OPM3 and CMMI experts. the first interview that took place with the OPM3 expert (Lotfy Sabry) covered the following topics:

- 1- Organizational Project Management Maturity Model (OPM3):
 - a. OPM3 Benefits to the organization
 - b. OPM3's role in achievement of strategy
 - c. OPM3 weaknesses
 - d. Differences between OPM3 and CMMI
 - e. OPM3 case study in Dubai Municipality difficulties
 - f. Recommendations for organizations seeking implementation of maturity models in project management
 - g. What is next for organizations that reached to the highest level of maturity (100%)
 - h. Possibility of merging maturity models together

The second interview that took place with the CMMI expert (P J Corum) was slightly based on the answers from the first interview and it covered the following topics

- 2- Capability Maturity Model Integrated (CMMI):
 - a. CMMI Benefits to the organization
 - b. CMMI's role in achievement of strategy
 - c. CMMI weaknesses
 - d. Recommendations for organizations seeking implementation of maturity models in project management
 - e. What is next for organizations that reached to the highest level of maturity (Level 5)
 - f. Differences between OPM3 and CMMI
 - g. Possibility of merging maturity models together

The next chapter will discuss the data collected based on the literature review and the researcher's opinion, observations and experiences.

5 Chapter Five: Discussion and Interpretation

This chapter includes discussion of the data collected through the Dubai Municipality OPM3 case study and the experts' interviews. This chapter will also include a summary of the main findings out of this research, discussion of the study propositions, limitations of the research and suggestions for future research.

5.1 Summary of the main findings

5.1.1 Overall themes

- ❖ CMMI practical engagement with the customer is considered as one event, that includes three levels of appraisals starting with C and B appraisals then plan to improve the processes, implement process improvements and then assess in the final appraisal.
- ❖ OPM3 practical engagement with the customer can be divided into the elements of OPM3, which means knowledge and assessment can take place as one event, then plan to improve as another event, then implement the improvements as another event, then the cycle is repeated.
- ❖ OPM3 expert's observation and recommendation from the case study matched his recommendations in the interview.
- ❖ Some of the challenges mentioned in the case study part by the researcher, matched the OPM3 expert's comments about the difficulties he faced during implementation of OPM3 assessment in DM, which he mentioned in the expert interview.

5.1.2 Case study

- ❖ The outsourced consultant who did the gap analysis and assessment that was done in order to establish the new ITD PMO, did not explicitly recognize which model he used to assess the project management practices in the year 2008.
- ❖ The knowledge of the Head of PMO about OPM3 during the implementation of the OPM3 assessment in Dubai Municipality was limited.
- ❖ Improvements were implemented based (indirectly) on the results of the assessment. (see page 49).

5.1.3 Experts' interviews

- ❖ The OPM3 expert had knowledge about CMM, however he did not mention the types of CMMI representations and he did not distinguish between CMM and CMMI. He mentioned the abbreviation "CMM" more than "CMMI".
- ❖ The CMMI expert had some knowledge of PMI standards; however his answers related to OPM3 model and the possibility to use OPM3 with CMMI were limited. And he agreed with the interviewers remarks about OPM3.
- ❖ The CMMI expert discovered from the course of the interview and from the questions he was asking to the interviewer, that OPM3 has the equivalent appraisal types to CMMI appraisals.
- ❖ The OPM3 expert talked a lot about how OPM3 can establish the link between projects and the achievement of the strategy using portfolio management in OPM3, however the CMMI expert did not mention directly how CMMI may achieve the strategy.
- ❖ Both experts agreed that there is no end to improvement for any organization.
- ❖ OPM3 expert had a clear idea based on academic knowledge about the possibility of merging OPM3 with CMMI for project management assessment, although he did not practice it with any of his clients.
- ❖ The CMMI expert understood the content of OPM3 based on the interviewer's explanation; therefore he explained clearly that CMMI and OPM3 differ in the depth of the scope when it came to the project management field.
- ❖ The CMMI expert had a clear idea based on practical and academic knowledge about the possibility of merging CMMI with models other than OPM3 such as ISO 20000 and COBIT.
- ❖ OPM3 and CMMI appraisal and assessment types are almost performed in the same way. There are levels of assessments in both models.

5.2 Discussion of the Research Propositions

This section discusses the research propositions in light of the literature reviews and the data collected:

P1. Mature organizations have better project performance.

Based on the literature review, a research study conducted by Dai and Wells in 2004, had proven that the existence of project management standards improves project performance. This can be done either through a PMO or without it.

The literature review also covered the concept of mature Project Management Offices which are considered part of the organization. The maturity of PMOs includes maturing the project management standards. OPM3 and other project management maturity models, focus on maturing those standards that can also be related to programs and portfolios. Therefore, mature project management standards within a PMO that is within an organization, will result in the improvement of project performances.

Moreover, the CMMI expert mentioned that one of the benefits of CMMI is improving the processes and therefore improving people's performance. The researcher believes that if a person's general performance improved by following a stable process in a mature organization, then -in case he was managing a project-, the performance of the project will improve as well.

P2.Maturity models are needed in organizations in order to improve their projects, programs and effectiveness of the portfolios.

Based on the case study data, this proposition has not yet been explored further since the implementation of OPM3 model in Dubai Municipality had stopped at the assessment phase, so only the baseline was acquired.

However, P2 is supported by the first proposition's discussion (P1), because according to the literature, maturity models take part in improving and maturity project, program and portfolio management standards.

Moreover, based on the OPM3 expert's interview, OPM3 maturity model is needed to baseline the current maturity level of an organization; however assessing at one instance has limited value. The benefit of OPM3 will be clear after the implementation of the whole model (knowledge, assessment, plan for improvement and improvement implementation). OPM3 links improved projects and programs to the organization's strategy and therefore, deliver effective portfolios.

Based on the CMMI expert's interview and the CMMI related literature review, the researcher believes that CMMI can contribute to the improvement of project management processes and the software development standards related to those projects; however CMMI has no relations with programs or portfolios.

P3.Maturity models are focused on the current status of projects, programs and portfolio environment. Moreover, they do not provide a clear way to go forward from the current status to the future desired status.

According to the literature review, most of OGC's models (P3M3) and (Prince 2 Maturity Model) consist of two elements: the assessment of current maturity level and the plan for performance improvement based on the assessment results to move up to higher levels of maturity. However, Kwak and Ibbs models PM2 and the Berkeley Project Management Maturity model, are considered assessment methodologies. Any improvement is based only of the assessment criteria and it is not considered as part of the model.

However, based on the literature review and the experts' interviews related to OPM3 and CMMI, these two major maturity models include an assessment phase that assesses current status of projects. OPM3 assesses current status of projects, programs and portfolios. CMMI measures the maturity of the some of the processes related to project management. Both models include a clear road map to improving the processes based on the assessments and an implementation of the improvements as part of the models.

The researcher noticed from the second interview that the CMMI model includes all elements of OPM3 in one engagement (knowledge, assessment and improvement), however OPM3 allows separate engagements of the OPM3 expert for (knowledge and assessment) and improvement (Plan and Implementation). However it can still be done in one engagement.

P4.Organizational project management maturity model (OPM3) is only useful when project environments are using PMI standards for projects, programs and portfolios.

Based on the literature review and the OPM3 expert interview, OPM3 is based on PMI's standards and the assessment of an organization will require the organization fulfilling the processes of those standards in order to have a good result. However, from the researcher's observations during the OPM3

assessment in Dubai Municipality, most of the processes in the project, program and portfolio management processes can be generalized and used to compare with other standards. The researcher believes that PMI standards can be compared to other standards, the main difference will be in the terminologies used.

However, the researcher did not find any OPM3 assessments done in organizations using other project management standards such as PRINCE2.

P5. Organizational project management maturity model (OPM3) can be used in government organizations in Dubai and it fits the culture.

The OPM3 assessment conducted in the case study presented in this research paper, demonstrates that OPM3 can be used in government organizations, not only in Dubai, but also in countries other than the United Arab Emirates. In the OPM3 expert interview, he mentioned that he implemented the OPM3 model three times for a private organization in Qatar.

Therefore, the researcher believes that OPM3 can be implemented in government and private organizations in the GCC countries. The literature review and other OPM3 PMI related case studies prove that it can be implemented in government and private organizations all over the world.

There was no clear study in this research whether OPM3 fits the culture of government organizations in Dubai; however, generally any kind of assessment will create some kind of conflicts between the assessor and those who are being assessed. Therefore, the researcher believes that it is the assessor's job to work well with the culture of the organization he or she is assessing and creates the assessment culture to avoid conflict.

P6. A combination of other maturity models along with Organizational project management maturity model (OPM3) can suit government organization in Dubai more than Organizational project management maturity model (OPM3) alone.

Based on the literature review, the researcher identified a number of limited articles related to using OPM3 with other maturity models. Macfadyen & Keuten (2007) believed that OPM3 and CMMI complement each other when used together. OPM3 will benefit the organization by guiding it through project, program and portfolio management processes. CMMI will benefit it in improving software

engineering processes and software development life cycle which is not covered in OPM3. But according to Macfadyen and Keuten, using the two models together will benefit large organizations more than small ones.

And according to the OPM3 expert's interview, Mr. Lotfy Sabry believed that OPM3 can be merged with other maturity models as long as there is no duplication of effort in collecting the evidences. Moreover, he believed that the same area cannot be assessed using two models at the same time, because this will give inaccurate overall results of assessment.

P J Corum, the CMMI expert stated that CMMI can be used for software product development and at the same time OPM3 can be used for project management processes as long as the overlapping between them is removed to make sure that the results will be honest.

The researcher believes that CMMI and OPM3 can be used together at the same time, OPM3 used fully for project, program and portfolio assessment and CMMI is used in the continuous representation and project management domain is not assessed using CMMI. As for using other models with OPM3, limited research was found by the researcher for the sake for this research study.

Finally, each maturity model has its strengths and weaknesses, therefore, it is recommended to take the best out of any maturity model or a number of maturity models and implement those to benefit the organization. However, the research did not demonstrate that such proposition is researched well, since mixing OPM3 with other maturity models was very limited in research especially for government organizations in Dubai and it did not show the long term benefits to the organization, even for the Dubai Municipality case study.

5.3 Limitations of the empirical research conducted

The research paper has some limitations that should be considered.

- ❖ Absence of previous OPM3 implementation case studies in the United Arab Emirates, since OPM3 is newly introduced to the market in the country, therefore the study was limited to qualitative research method.
- ❖ The number of OPM3 certified assessors and practitioners, is limited in the Middle East.

5.4 Suggestions for future research

- ❖ More case studies in government organizations in the uae related to OPM3 implementations should be documented.
- ❖ An attempt to mix CMMI and OPM3 models in a government organization in the UAE should be considered.
- ❖ Since OPM3 model is focused on PMI standards (portfolio, program, project), PMI related literature reviews do not compare OPM3 with CMMI. PMI or SEI should document a few of the case studies in that field.

6 Chapter Six: Recommendations

6.1 Introduction:

This chapter will state and recommend a few recommendations to different audiences based on the literature review and the data collected and in light of the discussion and analysis of the primary and secondary research data. Moreover, this chapter will also state the recommendations under the umbrella of some of the objectives of this research study which were as follows:

- Define and recommend the requirements necessary to use and implement maturity models effectively and identify when one model can be better than another model.
- Define and recommend the requirements needed to implement a successful OPM3 implementation in a Project Management Office or project environment in a government organization.

The following recommendations will target higher management in government organizations, higher management in private organizations, heads of project management offices, project teams, maturity models implementers or assessors, PMI and SEI, and academic researchers.

6.2 Higher management in government or private organizations

- ❖ Higher management in government organizations focus on justifying budget spent for maturity models, therefore, the researcher recommends that higher management should have enough knowledge about the benefits of maturity models to the organization, which eventually will save the organization money.
- ❖ Higher management need to give full support to maturity models implementations in their organizations, because without support employees will not be dedicated for the implementations and the results will not accurate. Moreover, support from higher management will help in completing the cycle of any maturity model so that it goes beyond just the assessment.
- ❖ Higher management should make it clear to the employees that any maturity model implementation will lead to change and they should make it clear to them that change is good and beneficial.

6.3 Heads of Project Management Offices

In case an organization includes a PMO, the following recommendations are targeted to heads of PMOs. However, in case an organization does not include a PMO, then the same recommendations will target officials who are involved in project control and follow up:

- a. Before implementing any maturity model in an organization, the head of PMO need to define the objectives behind implementing any model. For example, some of the objectives might be: improving program management standards in the pmo or measuring effectiveness project portfolios or knowing the current baseline of the maturity of different processes including project management processes in the organization.
- b. Choose the appropriate model based on the scope of the maturity implementation. For example, if the objectives are focused on measuring ITIL processes and software development processes, then CMMI would be more suitable. However, if the scope is to cover project, program and portfolio management standards in details, then OPM3 would be more suitable.
- c. Both models (CMMI and OPM3) can be used together if the scope was to cover software development processes and project, program and portfolio management processes. This can be done by eliminating redundancy between both models and saving time by collecting the evidences once only.
- d. Redo the assessment after each improvement project because the first assessment is a bench mark for the organization. The next step would be setting a target for the assessment result that an organization wants to achieve based on its current capabilities. It is recommended to redo the OPM3 assessment every 6 to 12 months which is optional. As for CMMI, it is mandatory to redo the CMMI appraisal every 3 years.
- e. Create the culture for assessment by getting other employees engaged in the assessment and treating them as key stakeholders for the assessment.
- f. Announce assessment results and create a shared understanding of the output of any maturity model to gain support and less resistance from other employees.

6.4 Project Teams

- ❖ When project teams (project managers and project team members) are involved in any maturity assessment, it is recommended that they should be impartial and fair when performing the assessment or when providing evidences of compliance to any model.

6.5 Maturity models implementers or assessors

- ❖ OPM3 engagements starting from knowledge and assessment should be sold properly to higher management to gain their support to continue with the whole model and get the required results
- ❖ Detailed knowledge of other maturity models is very important to know the capacity of each model and the possibility of merging two models together. This knowledge will also avoid misinterpretations between two different models.

6.6 PMI and SEI

- ❖ Based on this research study, the researcher recommends to Project Management Institute and Software Engineering Institute, that a shared effort should be put to document a few case studies where OPM3 and CMMI were used in the same organization. Currently no such case study exists in the databases of PMI or SEI.
- ❖ Experts in OPM3 and CMMI should be invited to a discussion panel created by either PMI or SEI or both, to discuss the benefits of each model and share the knowledge among PMI and SEI stakeholders and members. Merging the two models together can also be discussed in such a panel.

6.7 Academic researchers

- ❖ Further research is recommended for other academic researchers in the same field such as, researching the following:
 - Implementations of OPM3 in private organizations in the Middle East
 - Investigating the differences between any maturity model implementations in government and private organizations.
 - Investigating the usefulness of previous CMM related models such as Berkley model and PM2.
 - Comparing other case studies related to OGC's maturity models such as PRINCE 2 Maturity model and P3M3 model, to OPM3 case studies.
 - Investigating the long term intangible benefits of any maturity model implementation in government organizations.
 - Investigating the long term intangible benefits of any maturity model implementation in private organizations.

7 Chapter Seven: Conclusion

To recap, the objectives of this dissertation research were as follows:

- 1- Study different kinds of Project Maturity models, Project Management Offices Maturity Models and Process Maturity Models, in terms of how they are structured and their main benefits to organizations
- 2- Investigate the importance of Project Management Offices (PMOs) and how they are structured in organizations
- 3- Identify the reasons behind implementing maturity models in general and their effect on project performance
- 4- Investigate and analyze the implementation of a maturity model through the PMO, which is covered in the case study related to the implementation of Organizational Project Management Maturity Model (**OPM3**) assessment in Dubai Municipality.
- 5- Compare between **OPM3** and Capability Maturity Model Integrated (**CMMI**).
- 6- Define and recommend the requirements necessary to use and implement maturity models effectively and identify when one model can be better than another model.
- 7- Define and recommend the requirements needed to implement a successful **OPM3** implementation in a Project Management Office or project environment in a government organization

The researcher commenced this research study with the idea that OPM3 and CMMI are conflicting models that cannot be used together to benefit an organization. However, after collecting the primary and secondary data for this research, the main output of this research, in the researcher's opinion, is the knowledge that OPM3 and CMMI have different scopes and some redundant parts, however, they can still be merged and used together to get the advantages of both models to benefit the organization.

The main advantage of OPM3 model is the inclusion of portfolio management where the link between strategy and programs and projects can be established, which is not there in CMMI. On the other hand, the main advantage of CMMI model is inclusion of software development processes and some ITIL related processes as well, which is not

there in OPM3. As for the redundant parts, they are related to the project management processes; however the level of details differs between OPM3 and CMMI. OPM3 covers project management processes in many details and they are related to PMI standard, where as CMMI covers project management in less details and it refers to other project management standards.

To conclude, when an organization implements one or more maturity models, it has to wait and be patient to realize the benefits intended from implementing a maturity model. The way forward would be to learn from the mistakes during implementation and realize the long term benefits to the organization.

8 References:

- Chrissis, M. et al.** (2009) Capability Maturity Model (CMM) and CMM Integration (CMMI), *The Blackwell Encyclopedia of Management*, Blackwell Reference Online, 28th Feb 2011.
- Cooke-Davies, T. and Arzymanow, A.** (2003) The maturity of project management in different industries: An investigation into variations between project management models, *International Journal of Project Management*, 21(2003), p.471-478.
- Corum, P.** (2011) *CMMI Interview*. Interviewed by Heba AlShehhi [in person], Dubai Internet City, Quality Assurance Institute Middle East Office, 6th of April 2011.
- Dai, C. and Wells, W.** (2004) An exploration of project management office features and their relationship to project performance, *International Journal of Project Management*, 22(7), p.523-532.
- Denscombe, M.** (2007) *The Good Research Guide*, 3rd ed. Berkshire: Open University Press.
- Desouza, K. and Evaristo, J.** (2006) Project management offices: A case of knowledge-based archetypes, *International Journal of Information Management*, 26(5), p.414-423.
- Dubai Municipality, PMO Document.** (2009) *PMO Activities*, Dubai: Dubai Municipality, p.4.
- Dubai Municipality** (2010) *Information Technology Department*, [online] Available at: http://login.dm.gov.ae/wps/portal/DepartmentHomePageEn?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/dmcontenten/Home/DepartmentHomePages/7&deptid=DMDesign/7 [Accessed: 8th of feb 2011].
- Dubai Municipality** (2010) *Vision Mission Values*, [online] Available at: http://login.dm.gov.ae/wps/portal/CommonPageEn?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/dmcontenten/Home/Common/VisionMission [Accessed: 8th Feb 2011].
- Dubai Municipality, PMO Document** (2008) *Gap Analysis Report*, Dubai: Dubai Municipality, p.14.
- Dubai Municipality, CMMI Project Document** (2011) *CMMI Proposal Presentation*, Dubai: Dubai Municipality, p.6.
- Flick, U. et al.** (2004) *A companion to qualitative research*, Glasgow: Sage Publications Ltd.

- Hill, G.** (2004) EVOLVING THE PROJECT MANAGEMENT OFFICE: A COMPETENCY CONTINUUM, *Information Systems Management*, 21(4), p.45-52.
- Kendall, G. and Rollins, S.** (2003) *Advanced project portfolio management and the PMO, multiplying ROI at warp speed*, Florida: J.Ross Publishing.
- Keuten, T. and Macfadyen, T.** (2007) Collaborative opportunities for using OPM3 and CMMI, *Project Management Institute*, p.1-21.
- Kwak, Y. and Ibbs, C.** (2002) Project Management Process Maturity PM 2 Model, *JOURNAL OF MANAGEMENT IN ENGINEERING*, 18(3), p.150-155.
- Mutafelija, B. and Stromberg, H.** (2003) *Systematic process improvement using ISO 9001:2000 and CMMI*, Norwood: Artech house, inc.
- OGC** (2009) *Maturity Models*, [online] Available at: http://www.ogc.gov.uk/tools___techniques___maturity_models.asp [Accessed: 26th Sept 2010].
- OGC** (2010) *Tools & Techniques*, [online] Available at: http://www.ogc.gov.uk/introduction_to_the_resource_toolkit_tools_techniques.asp [Accessed: 16th Oct 2010].
- OPM3 Online** (2004) *OPM3 Executive Guide*, [online] Available at: <http://opm3online.pmi.org> [Accessed: 2nd Nov 2010].
- OPM3 Online** (2007) *OPM3 Online or OPM3 Product Suite, A Comparison of Factors and Features*, [online] Available at: <http://opm3online.pmi.org> [Accessed: 8th oct 2010].
- P3M3** (2011) *P3M3 Model*, [online] Available at: <http://www.p3m3-officialsite.com/P3M3Model/P3M3Model.aspx> [Accessed: 2nd Oct 2010].
- PRINCE 2** (2011) *What is PRINCE2*, [online] Available at: <http://prince2.com/what-is-prince2.asp> [Accessed: 14th jan 2011].
- PRINCE 2** (2011) *PRINCE2 Maturity Models*, [online] Available at: <http://www.prince2.com/prince2-maturity-models.asp> [Accessed: 28th nov 2010].
- Project Management Institute** (2008) *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 4th ed. -: Project Management Institute, Inc, p.11.

Project Management Institute (2008) *Organizational Project Management Maturity Model (OPM3): Knowledge Foundation*, 2nd ed. Project Management Institute.

Sabry, L. (2011) *OPM3 Interview*. Interviewed by Heba AlShehhi [in person], Dubai Municipality, 31st March 2011.

Shrum, S. (1999) Continuous and Staged, a Choice of CMMI Representations, *News at SEI*.

Software Engineering Institute Carnegie Mellon University (2011) *CMMI, Appraisal Classes*, [online] Available at: <http://www.sei.cmu.edu/cmmi/tools/appraisals/classes.cfm> [Accessed: 15th jan 2011].

Stake, R. (1995) *The art of case study research*, California: Sage Publications, Inc.

Wangenheim, C. et al. (2011) Best practice fusion of CMMI-DEV v1.2 (PP, PMC, SAM) and PMBOK 2008 , *Information and Software Technology*, 52(7), p.749-757.

9 Appendix: Sample of Interview Transcript

Interviewer:

As an OPM3 consultant and certified assessor, what do you think is the major benefit of OPM3?

Lotfy:

I personally see that OPM3 can help organizations achieve their strategy successfully. Almost ten years ago Project Management was considered as personal competency. By that I mean the soft skills of project managers such as communication and conflict management skills and so on. However, now project management moved beyond the boundary of personal competency to become organizational competency.

Organizational competency means the skill set and the energy required by a company in order to achieve each strategic objective.

Interviewer:

So it doesn't just depend on the project managers' skills, it depends on the organization and the project managers.

Lotfy: exactly, since the project management was linked to personal skills it was difficult to link it to the organization. That's why a new version of project management emerged, which is Organizational project Management. By that I mean how companies use their tools, skill sets, knowledge in the three domains of project, program, portfolio to achieve it the organizational objective. This is done through one of OPM3 components which is portfolio management. Portfolio management is the first step in organizational project management. It will help organizations select the right mix of investments. There are a lot of processes involved in portfolio management; some of them are identifying new project ideas, categorizing them as per strategic categories, evaluating them, balancing them, how to consider risk when selecting the project. It's all about how to align your new project ideas with the strategic objectives and how much of the strategy will get implemented when you decide to start with one of these projects.

Once the new project idea has been selected and proved that it's going to achieve the strategic objectives, and then we move to project management, which is delivering the initiatives through projects or programs.

Interviewer: how OPM3 will measure the achievement of the strategy?

Lotfy: OPM3 has extracted a number of best practices from the other PMI standards since OPM3 is aligned to the portfolio management standard, program management standard and project management standard. I was one of the volunteers with the OPM3 standard development team and I can tell you that we extracted best practices from those three standards, and we created a new standard based on those best practices and we identified the capabilities required to meet those best practices.

As an OPM3 consultant, I compare the best practices in OPM3 with the organization's best practices and assess them to understand the gap.

Interviewer: some people say that there is a few weaknesses in OPM3 model, such as the big number of questions and that OPM3 is not a flexible model compared to other models such as CMMI, is it true?

Lotfy: No, this is totally not true. The reason behind that is there is a lack of experience in OPM3.

There are two types of maturity models, prescriptive and multi dimensional. Prescriptive maturity model is similar to CMMI. It means that there are levels from 0 to 5, each level has prerequisites. Similar to a doctor's prescription, if a person is sick, he or she needs to take a medicine or two from the prescription in order to feel alright. CMMI doesn't include a diagnosis; it has predefined best practices for each level. The CMMI assessor will assess the organization by going through all the stages and depending on the answer, he or she will assign you a level.

The other type of maturity model is multi dimensional, where there is no level for improvement. You have to scope based on your requirements. This is very flexible to the extent that even a supermarket using project management for its initiation activities only, can ask for an OPM3 assessment with a scope of covering the project management domain and the initiation process groups. In that case, I scope the OPM3 assessment using OPM3 product suite to cover the required scope only. Although OPM3 includes 1682 questions, they are not all required to the organization. The first step of the assessment includes scoping the requirement for an organization and this is not available in CMM.

Interviewer: what is next for an organization that reached to 100% of improvement in OPM3 assessment, covering all domains and the full scope?

Lotfy: assuming this can happen, don't forget that OPM3 consists of 4 domains, project, program, portfolio and organizational enablers. So for a company to reach to 100% in all of them, this would be a very difficult job. But you're right this might happen. PMI releases a new standard or an updated standard every four years, this means that each development cycle of a standard will change every four years. For example, the number of best practices has been reduced from 588 in the first edition of OPM3 to 480 in the second edition, because some best practices proved not to be best practices. Each organization has to link their maturity assessment and improvement with the new release of best practices every four years. So if a company achieved 100% in a period of four years, it has to assess again to make sure the percentage doesn't go below 100% and whenever a new release has been released, they will use it for benchmarking purposes.

Interviewer: you implemented OPM3 assessment for Dubai Municipality in 2009 being a certified OPM3 assessor, what do you think was the major difficulty or difficulties that you faced?

Lotfy: I faced two problems during the assessment period:

1. Access to information, at that time Heba you were newly appointed as head of PMO and you didn't know where documents were stored, or who was doing what and the information were not stored in the right way. Therefore, we estimated the assessment will take two weeks, but we took 5 weeks instead.
2. No resources helping the head of PMO, there was a lot of learning to be done and searching for evidences and this slowed down the process as well
3. Others were that best practices were scattered here and there, and there was no proper organization taking care of the governance of processes and we had to collect all of them.

My only criticism for Dubai Municipality is that it did OPM3 training and assessment only and stopped at that. They didn't continue with the full cycle of OPM3 improvement planning and the improvement implementation and assessment again. You have to do assessment at least one to two times per year to make sure that you are always complying. Doing assessment one time only has no value.

Interviewer: the OPM3 improvement plan project was included in the 2010 plan but the higher management thought that spending money on improvement of OPM3 was not justified and useful to Dubai Municipality. What do you have to reply to that?

Lotfy: simple answer to the head of IT department, if you would like to achieve the strategy of the Information Technology department, the more you have best practices implemented, the more you are increasing the probability of success. Unfortunately, most of the managers look for project that will give them tangible benefits such as adding hardware. But I need to bring to their attention, that in OPM3 they will not get direct improvement results, they will be indirect and intangible benefits.

Interviewer: what are your recommendations for organizations seeking maturity in project management using not only OPM3 but also other models?

Lotfy: Maturity is how the company is practicing project management. That means before you measure maturity, you have to practice project management. And in order to practice project management you have consider the four pillars of project management, which are people, process, technology and organization. The most important is the people side that includes project management training, creating the culture, process methodology training, and training on the tools that automate the processes that are aligned with best practices. Once all of this is in place, then you can consider maturity models, so maturity is an advanced stage for an organization.

Interviewer: do you think it's possible to mix two different maturity models together, how can It benefit the organization and at which stage?

Lotfy: Yes and No.

Yes: for different application area

No: for the same area

For example, don't assess project management using two different maturity models, this is wrong.

Interviewer: even if we did it not at the same time?

Lotfy: yes it would be a waste of time and efforts and you will get horrible results. Because each maturity models has its own prerequisites and in order to meet them there is a lot of effort in order to collect the needed evidences and documentation.

Lotfy: in OPM3 we can rank those processes covered in CMMI as not applicable and take them out of the scope of assessment, in this way, we will avoid redundancy to get an honest result in both models.