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## Challenges and Solutions for Implementation of OPM3 in the Iranian Petrochemical Industry

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**Abstract :** In recent years, most government agencies and private companies have sought to shape their activities based on projects. They found that by moving towards project-oriented organization, they will be able to use human and capital resources more effectively and achieve better results in accomplishing their tasks. The state of the organizations in this transition can be examined by the maturity models of the project. One of the most popular of these models is the Organizational Project Management Maturity Model (OPM3), which consists of several parts. Since this model was created by the Project Management Body of Knowledge (PMBOK), it has the most coordination with organizations that use the PMBOK standard, including Iranian organizations. Some parts of the OPM3 model, especially the assessment section, have been implemented in Iranian organizations. In this paper, the challenges of implementation of the OPM3 maturity model in Iranian petrochemical industry are discussed employing relevant experts. Finally, various strategies for these challenges are proposed.

**Keywords:** Maturity model, OPM3, Project management, Organization, Petrochemical industry

### 1. Introduction

Organizations are looking to increase their value-added in the form of projects. Project management is a way to achieve this aim. "Based on this fact, there has been a lot of effort in organizations in recent years in the practical and theoretical field of project management," (Cooke-Davies et al., 2009). One of these organizations, evaluated in this research is in the petrochemical industry. The petrochemical industry, as a set of organizations whose projects have high costs, may need project management and using of its techniques even more than other organizations. Organizations are trying to design and develop the required processes using existing standards in the field of project management. Ibbs considers standards as a contributing factor to organizations and believes that standards such as project management and portfolio management are among the standards presented in this field, and organizations are trying to meet their requirements in order to reform or amplify their processes, decision-making committees the scope of their authority and structure align with being project-oriented (Ibbs & Kwak, 2000). Fernandes and her colleagues agree with Ibbs. They believe that today, it is necessary to use standards to communicate with the people involved in the organization and to ensure the sound implementation of the work (Fernandes et al., 2013). Standards, in addition to explaining requirements and determining the process of proper implementation of requirements, are also considered as a reference for successful examples of implementation of requirements. The strengths of the standards are comprehensiveness, the ease of understanding, public acceptance, and ensuring that the work is done correctly (Fernandes et al., 2013). In this regard, some of these standards audit and investigate how other standards are established. OPM3 is one of the most well-known standards examining maturity rate of project management, program, and organizational portfolio (Grant & Pennypacker, 2006). In 2003, the Project Management Institute proposed an organizational project management maturity model (OPM3) that was a general maturity model (Berssaneti et al., 2012). The purpose of this study is to assess the challenges of implementing the OPM3 maturity model in Iranian petrochemical industry and provide solutions to improve the implementation of this model in these organizations. The case study used in this research is the Petrochemical Industries Development Management Company. We want to answer these questions: What are the main challenges in implementing the OPM3 growth model in the petrochemical industry? And what strategies can be considered to address these challenges?

### 2. Literature review

In response to the question of why maturity models are used today, Jia and Cooke Davies say; As organizational maturity models directly or indirectly contribute to the assessment and improvement of organizational maturity of

project management, interest in using them is increasing (Cooke-Davies et al., 2009; Jia et al., 2011). The roots of maturity models should be sought in comprehensive quality management that originates from the perspective of continuous improvement and requires a full understanding of current situation and future direction of organizations. The first maturity model was developed in the United States, specifically at the Institute of Software Engineering at Carnegie University, which was only effective for software development. This eventually led to the release of the Capability maturity Model in 1991, which included five levels of maturity and due to the success in the field of software engineering was used in other fields (Demir & Kocabaş, 2010; Haar, 2008). After that, this model evolved into a more comprehensive model called the Total Quality Management (TQM) Model. A model that was no longer limited to information technology (IT) organizations and could be used in organizations and companies in any field and department (Berssaneti et al., 2012). Successful application of Total Quality Management has encouraged project management professionals to research and develop maturity assessment models in project management (Lianying et al., 2012). In 2003, the Institute of Project Management proposed a public development model called the Organizational Project Management Maturity Model (OPM3). This model helps organizations improve their capability to support large business processes to manage all projects and links these processes and business strategy and also provides a systematic assessment and improvement approach for a single project and a portfolio of projects in the organization (Berssaneti et al., 2012). The first version of the OPM3 maturity model included an assessment questionnaire. In 2008, when the second version of this maturity model was released, the only change to the first version was that the second version in addition to the portfolio project standard adopted in 2006 by the Institute of Management was published to assess organizational empowerment criteria such as structural, cultural and technological resources (Berssaneti et al., 2012). The most important issue to be addressed in the 2013 version of the restructuring of this model is synchronization with other project management standards such as PMBOK standard, Guide standard, the third edition of the project, and the project portfolio management standard. That is to ensure that all the fundamental concepts are described in one direction (Project Management Institute, 2013). This model includes tools and methods that provide continuous assessment for the organization, as well as complication techniques that identify potential defects and problems within the projects, as well as a detailed plan of improvements that must be made. Organizational Project Management Excellence Model in the form of a book with detailed information, the main list of the best performing strategies that are considered the best methods, a tool to check the status of the organizational project, and a dedicated glossary that includes a list of capabilities, the best performing strategies and all the information needed by managers to create an improvement plan for organizations is provided (Fahrenkrog et al., 2003). This standard, relying on capabilities and empowerment, provides successful examples of project management at all levels (Grant & Pennypacker, 2006). The components of the OPM3 model are (Qifang et al., 2009):

- Best practices: For organizational project management, top strategy means the ability to deliver the project successfully, consistently, and in anticipation of the strategies set by the organization.
- Capabilities: Increasing steps along the path of maturity, a set of skills make it possible to achieve the best solutions.
- Outcomes: Results are tangible or intangible feedback that results from the use of skills.
- Key practice indicators: The key measurement indicator shows the method and tools by which the results are measured through a decimal system.

OPM3 Evaluates organizational activities in project management, program and portfolio through capability analysis and compares with the best practice solutions. Therefore, organizations in the process area of any project, plan or program and portfolio level can be categorized into four types of improvement steps (Pinto & Williams, 2012):

- Standardization: Adopting structured processes
- Measurement: spending data to evaluate process performance
- Control: Control planning for the desired metrics
- Continuous improvement: process optimization

Beyond the development steps mentioned above, there is another category of the best performance style of organizational project management excellence model, which is called the best-performing methods of organizational empowerment (structural, cultural, technological, and human resources) (Project Management Institute, 2013), and implementation of improvement steps establishes best performance practices (Project Management Institute, 2013). In the assessments provided and presented by this model, the consultants of this model have a database including 600 best performance methods that enable them to compare and evaluate organizational maturity. The realized improvements are based on the best performance methods collected and analyzed in project management, program, project portfolio, and organizational empowerment. Unlike other maturity models of project management, this model measures organizations in a score of 0 to 100. If we want to summarize this model, we can say: it is a tool that can be used for organizations in any dimension, with any geographical location and any functional area, and its purpose is to identify the level of maturity of the organization's projects and the performance methods implemented by the project managers. These performance

methods using the best-performing methods for comparison and are a well-known and accepted model in the world that requires the implementation of appropriate performance methods in line with the organization's strategy and mission. Regarding the background of this research, it can be said that in 2003, a study was conducted by Penny Parker and Grant to provide an implementation of project management maturity in several industries to empower companies in measuring their relative maturity in terms of project management competence, which showed 67% of organizations are at a level of maturity of organizational project management from 5 levels (Grant & Pennypacker, 2006). In 2008, a study was conducted on the application of the maturity model of organizational project management in the construction industry in China. This study is related to the level of maturity associated with the construction project of Pudong International Airport in Shanghai, China. The results show that this model evaluates the level of maturity and also suggests key points to improve the level of management. Therefore, this model can be used in China, but some prerequisites such as the culture of project management maturity model guidance and model training and project management planning are expected to be identified initially (Guangshe et al., 2008). In 2010, three researchers conducted a study on the maturity status of reputable construction companies in Iran using the Organizational Project Management Maturity Model. In their research, the maturity status of 81 first-class construction companies was first assessed. One of the main findings of the research was that companies have been in a favorable position in the standardization phase, but they must redouble their efforts to take other steps in the maturity model of organizational project management. The results showed that 59% of the largest Iranian companies had a maturity rate of less than 50%. Of course, there was no significant correlation between the company's maturity, which was derived from the OPM3 questionnaire, and the company's historical background. Beyond these issues, it was observed that only companies with a significant level of maturity can win international tenders (Ghoddousi et al., 2011).

### 3. Methodology

This paper is a descriptive (non-experimental) research based on a case study data collection method. This research is qualitative because of the low number of organizations that have used the OPM3 maturity model in the oil industry. Since the authors wanted to assess the organization in-depth, the information obtained concerning the challenges of implementation and proposed solutions to be more precise, a case study approach has been selected. The data collection tool is an interview, which is consistent with the qualitative approach of the research. The method of data analysis is the analysis of semi-structured interviews. Before the interview, the authors gathered the basic information and review the literature on the subject. The statistical population includes all those who participated in or were involved in the implementation of the OPM3 model in the Iranian oil industry. The research sample includes ten people who have cooperated more in the implementation of this model in the Petrochemical Industries Development Management Company and are also current employees of the company's Project Management Research Center unit and have been willing to cooperate. According to interviews, the challenges, and solutions for implementing the OPM3 have been evaluated. The following criteria were used to assess the validity and reliability of the interview (Gubba & Lincoln, 1994; Rao & Perry, 2003):

1. Reliability (replacing internal validity in quantitative research): has been attempted to obtain accurate information. The coding was done and when the information was collected, the interviews were compared with the literature of the subject to check that there were no inconsistencies.

2. Transferability or portability (replacing external validity in quantitative research): This section refers to the generalizability of research findings. Regarding how similar the company is to all Iranian oil industry organizations in terms of the perspective, it can be said that the implementation of OPM3 model in all Iranian oil industry organizations has many similarities and the findings are generalizable. Two project management experts have confirmed this. Interviews with more experienced and expert people have been attempted to be conducted.

3. Verifiability (meaning avoidance of bias. Indicates the researcher's attempt to establish an objective index in the research): In this research, the researcher has not only used one question in the interview but also asked several questions to gain a deep understanding of the subject. It was attempted to resolve some of the contradictory interpretations.

4. Reliability (equivalent to reliability in quantitative research): It refers to the degree of data recyclability and reproducibility of other individuals. This research has tried to ensure that the processes followed are accurate, the interviews are understandable and convergent, and the data collected are reliable and that the researcher has sufficient accuracy and controls. The spatial domain of research is the petrochemical industry development management company.

#### 3.1 Case Study

Petrochemical Industry Development Management Company was established in February 1994 as a state-owned company in various specialized sectors including engineering, logistics, building and provides installation, commissioning, and project management in the industrial and infrastructure areas (*Petrochemical Industries*

*Development Management Company*, 2020). Due to privatization in the petrochemical industry in 2013, the company has been transferred to the private sector as a subsidiary of the Persian Gulf Petrochemical Company (Holding) and has expanded its effective presence in implementing petrochemical industry development plans (*Petrochemical Industries Development Management Company*, 2020).

#### **4. Results and Discussion**

Since the application of OPM3 in this organization dates back to some years ago, in interviews with current employees of the company's Project Management Research Center, there was not enough information about the questions and sometimes received incorrect and contradictory information with available documents. Attempts were made to base the findings on interviews in which the interviewee was in the process of implementing the model, and on the contradictions of the interviews with each other, existing documents and literature were based, and findings that contradicted them were removed. The findings, obtained after noting the answers to the questions and separating them from the coding and analysis and then controlling them based on what has been said. These findings include two sections, challenges, and solutions, for implementing the OPM3 model in the organization which are stated below.

##### **4.1 Challenges of Implementing the OPM3 in this Company:**

In one perspective, this model can be divided into four parts: project, program, portfolio, and organizational empowerments.

###### **4.1.1 Project, program, and portfolio:**

Because this maturity model is a standard based on PMBOK from the PMI (Project Management Institute, 2004), the challenges of implementing it in the organization are the same as the challenges of implementing PMBOK in three areas: project, program, and portfolio. Here are some examples of these challenges:

- Cultural
- Structural
- Unfamiliarity

###### **4.1.2 Organizational Empowerments:**

This is the hardest part of OPM3. Organizational empowerments offer a significant number of superior solutions that are both immense and complex. This section was not implemented in OPM3 implementation in the organization.

In the other perspective, this model can include three elements: knowledge, assessment, and improvement, which enable OPM3 to enable organizations to better achieve their strategic goals. Figure 1 illustrates these steps (Project Management Institute, 2004).

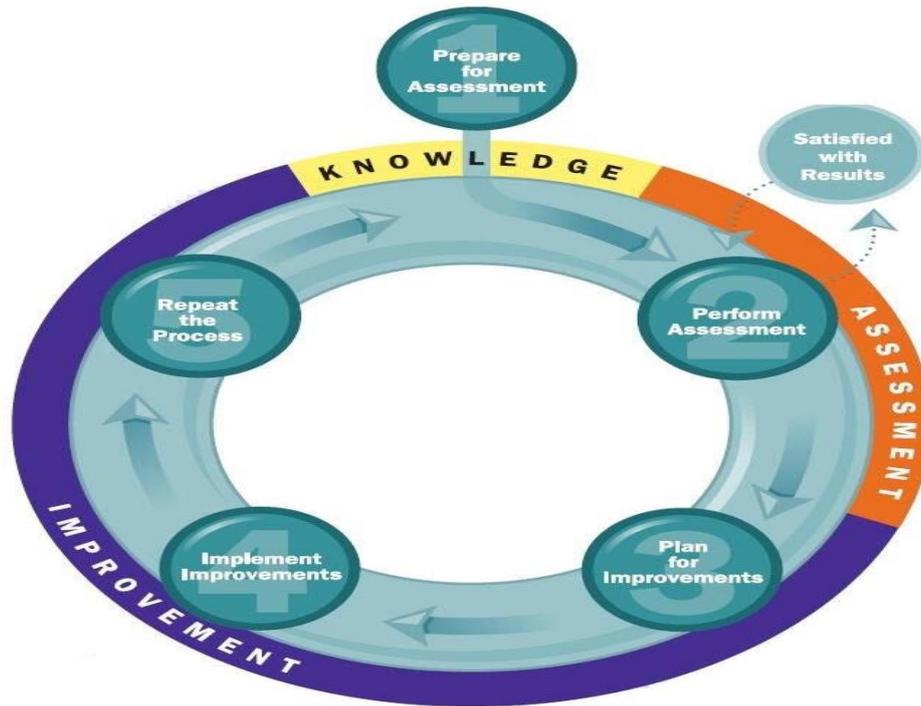


Figure 1- OPM3 Maturity Model Steps

4.1.3 The only assessment phase was implemented in the organization.

Because this cycle is very time-consuming, and this model is very heavy for the full implementation of the model and has many dimensions and is not easily understood; from most interviewees’ view, the assessment is close to reality.

- One of the problems of the assessment section is that the results cannot be generalized to many tasks and projects, and in addition, the technical language of the questionnaire must be added to its weaknesses.
- Another challenge of the assessment section is that this model need trained assessors and needs a preparation stage. Finding trained assessors was hard work at that time.
- Finally, the surveyed organization only used the assessment part of this model once.

Challenges of implementing the Organizational Project Management Maturity Model (OPM3) in this company are summarized in Table 1.

Table 1. Challenges for Implementation of OPM3 in the Iranian Petrochemical Industry

Interviewees	Project, program, and portfolio:			Organizational Empowerments: was not implemented	knowledge, assessment, and improvement			
	Cultural	Structural	Unfamiliarity		The only assessment phase was implemented	trained assessors	preparation stage	only used the assessment part once
1	*	*	*	*	*	*		*
2		*	*	*	*	*	*	*
3	*	*	*	*	*	*	*	*
4	*	*	*	*	*		*	*
5	*	*		*	*	*	*	*
6	*	*	*	*	*	*	*	*

7	*	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*	*
9	*		*	*	*	*	*	*
10	*	*	*	*	*	*	*	*

**4.2 Solutions for implementing the Organizational Project Management Maturity Model (OPM3) in this company:**

**4.2.1 Project, Portfolio, and Program Strategies:**

- PMBOK localization
- Educating
- Using previous experiences

It is worth noting that many studies have been done so far on these solutions and it is possible to implement PMBOK in Iranian organizations and to localize it.

**4.2.2 Organizational Empowerments Strategies:**

- Supporting the researchers related to this field
- Spending time and money on mastering the empowerments
- Simplify concepts and implement them
- Using experienced staff to implement empowerments

This is the most difficult part of implementing the OPM3 model, which requires theoretical training and spending time and cost.

**4.2.3 Strategies for implementing all OPM3 steps in the organization:**

- These solutions cover all solutions related to the organizational empowerments sector.
- Supporting for OPM3 students or researchers
- Spending time and money on mastering the whole process
- Simplify concepts and implement them
- Using experienced staff to implement all steps
- Using experienced teams or people outside of Iran who have fully implemented this model and being trained to learn from them.

**4.2.4 Strategies for continuous use of the OPM3 in the organization under review:**

- Finding sufficient mastery in the full implementation of this model
- Using an experienced team
- Documentation and recording positive results from their implementation

Solutions of implementing the Organizational Project Management Maturity Model (OPM3) in this company are summarized in Table 2 and Table 3.

**Table 2. Solutions for Implementation of OPM3 in the Iranian Petrochemical Industry**

Interviewees	Project, program, and portfolio:			Organizational Empowerments:			
	PMBOK localization	Educating	Using previous experiences	Supporting the researchers	Spending time and money	Simplify concepts	Using experienced staff
1	*	*	*	*	*	*	*
2		*	*		*	*	*
3	*	*	*	*	*	*	*
4	*	*	*	*	*	*	
5	*	*	*	*	*		*
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*
9	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*

**Table 3. Solutions for Implementation of OPM3 in the Iranian Petrochemical Industry**

Interviewees	knowledge, assessment, and improvement							
	Strategies for implementing all OPM3 steps					Strategies for continuous use of the OPM3 model		
	Supporting the researchers	Spending time and money	Simplify concepts	Using experienced staff	Using foreign experienced teams	Finding sufficient mastery in the full implementation of this model	Using an experienced team	Documentation and recording
1	*	*	*	*	*	*	*	
2		*	*	*		*	*	*
3	*	*	*	*	*	*	*	*
4	*	*	*		*	*	*	*
5	*	*		*	*	*	*	*
6	*	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*	*
9	*	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*	*

**5. Conclusion**

The need to stay competitive, and the desire to grow and improve, drive organizations to use project management and maturity models. The OPM3 Maturity Model is the most well-known maturity model applicable to all three levels of project, program, and portfolio and complies with the PMBOK standard. Petrochemical Industry Development Management Company is one of the companies that implemented part of this model. In this research, the most important challenges that have been encountered in implementing this model for the organization are: "Cultural and structural challenges and non-familiarity in a project, program, and portfolio, challenges in understanding, recognizing and implementing organizational empowerments, Failure to implement all OPM3 steps in the organization and failure to continue using this model in the organization". The following solutions have been identified to address them: "PMBOK localization, adequate training, using past experiences, supporting for students and researchers in this field, spending time and money on mastering all parts of this Model, simplifying concepts and implementing them, using experienced staff, using teams or people who have fully implemented the model outside of Iran and being trained by them, documentation and registering the positive results from the implementation of the OPM3 development model." These strategies are likely to be good answers to the challenges that will arise and will improve the organization. It should be noted that the most challenging part in implementing this model is organizational empowerments. It is recommended to spend sufficient time and money on mastering or training the model before implementing the model. It seems that implementing the OPM3 model in the Iranian petrochemical industry still requires deep study, planning, deep understanding, and much work.

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