Assessing Organizational Capabilities: A Review of Four Management Capability Models and Their Strengths and Weaknesses

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Abstract. The process maturity model and the management capability index are both frameworks that organizations can use to assess their capabilities and identify areas for improvement, but they have different strengths and weaknesses. This paper presented four models: Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI), Project Management Capability Assessment (PMCA) and Management Capability Index (MCI). A brief review will compare these models, by analyzing their general strengths, weaknesses, and differences in terms of their approach to measuring management competences. Choosing the most appropriate model depends on the specific needs and context of the organization, and a combination of different models may provide a more comprehensive assessment of management capabilities.

Keywords. management competencies, process maturity, CMM, CMMI, PCMA, MCI

1. Introduction

Management capability refers to the skills, knowledge, and experience that a company's management team retain, and its ability to effectively plan, organize, lead and control the organization's resources and activities to achieve its goals. Competence and skills management have been tightly linked to the efforts of companies to create a setting for the empowerment of their workforce in order to increase competitive advantage, innovation, and effectiveness [1].

Throughout the years competency based approaches have proved to be a critical tool in many organizational functions, such as workforce and succession planning and performance appraisal [2]. Effective management capability is critical to the success of any organization, as it helps to ensure that the company is able to adapt to make informed decisions and effectively allocate resources.

The management capabilities of an organization do not only reflect its competitiveness within the industry and profitability in the market, but also indicate its business capabilities in achieving its own vision, mission, values, strategies and goals [3]. Therefore, measuring management capability is important to identify strengths, weaknesses and provides an objective evaluation of an individual's capabilities. For that reason, this paper aims to present the different models of measure

management capabilities and compare these models. The models that will be presented are Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI) and Project Management Capability Assessment (PMCA) and Management Capability Index (MCI),

2. Literature Review

2.1 Capability Maturity Model (CMM)

The Capability Maturity Model (CMM) was first introduced in 1987 by the Software Engineering Institute (SEI) at Carnegie Mellon University in the United States, but has been adopted by several other countries, including Australia and the United Kingdom. The CMM is a framework that is based on five levels of process maturity, ranging from Level 1 (chaotic) to Level 5 (continuous improvement).

These five maturity levels define an ordinal scale for measuring the maturity of an organization's software process and for evaluating its software process capability [4]. Each level is characterized by a set of key process areas, which organizations can use to assess their performances and identify areas for improvement. The five levels of process maturity in the CMM are [4]:

1. Initial: The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort.

2. Repeatable: Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications

3. Defined: The software process for both management and engineering activities is documented, standardized, and integrated into a standard software process for the organization. All projects use an approved, tailored version of the organization's standard software process for developing and maintaining software.

4. Managed: Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.

5. Optimizing: Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.
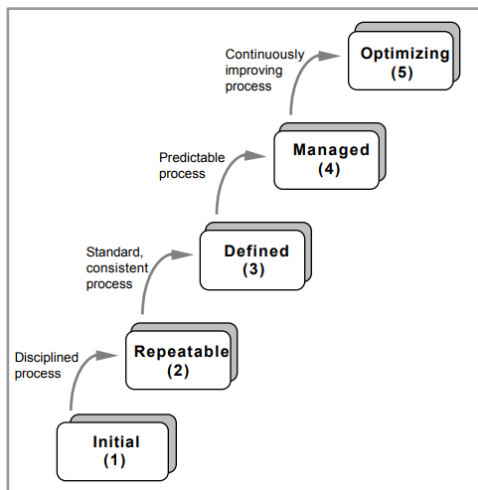

Fig. 1 - The Five Levels of Software Process Maturity

The presence of maturity models is important for any organization to be able to assess their process maturity and make improvements [5]. Therefore, the CMM used by the Australian government is based on the same five levels of process maturity as the original CMM, but it has been adapted to reflect the unique challenges and requirements of the public sector and to evaluate the management capabilities of government agencies. By assessing their process maturity and identifying areas for improvement, organizations can develop strategies to optmize their performance and achieve ther goals.

2.2 Capability Maturity Model Integration (CMMI)

The CMMI model is a set of best practices for organizations to improve performance in terms of software development process [6]. The Capability Maturity Model Integration (CMMI) is a more comprehensive version of the CMM, which was developed to provide a framework for assessing an organization's overall capability across multiple domains, such as software engineering, systems engineering, and project management. The purpose of CMMI is to provide guidance for improving your organization's processes and your ability to manage the development, acquisition, and maintenance of products or services [7]. The model is widely used in the United Kingdom.

The CMMI project was formed to sort out the problem of using multiple CMMs. The CMMI Product Team's mission was to combine three source models—(1) Capability Maturity Model for Software (SW-CMM) v2.0 draft C, (2) Electronic Industries Alliance Interim Standard (EIA/IS) 731, and (3) Integrated Product Development Capability Maturity Model (IPD-CMM) v0.98—into a single improvement framework for use by organizations pursuing enterprise-wide process improvement [8]. This model was designed to help organizations improve their processes across a wide range of areas, including software development, systems engineering, project management, and support functions.

The model is structured into several levels, each representing a higher level of process maturity. The levels are: Initial, Managed, Defined, Quantitatively Managed, and Optimizing. Each level builds on the previous one, and organizations can use the model to guide their process improvement efforts as they progress through the different levels. Fig. 2 shows these levels.
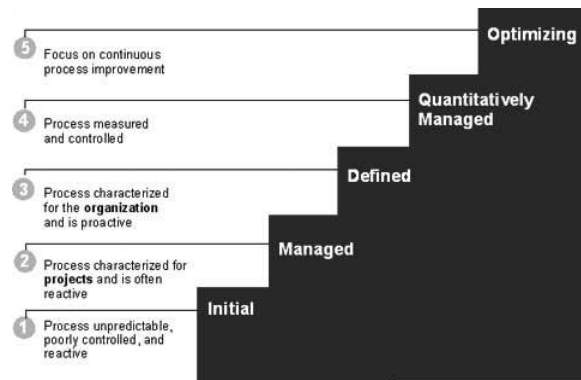

Fig. 2 - CMMI Maturity Levels

One of the strengths of CMMI is its comprehensive and integrated framework for process improvement. It provides a structured approach to process improvement that is applicable to a wide range of industries and organizations. It also provides a common language for discussing process improvement, which can help organizations communicate more effectively about their processes and identify areas for improvement.

However, one of the weaknesses of CMMI is that it can be complex and time-consuming to implement. It requires a significant investment of time and

resources, and organizations may need to hire consultants or other experts to help them implement the model effectively. Additionally, some organizations may find the model too prescriptive and inflexible, and may prefer a more customized approach to process improvement.

2.3 Project Management Capability Assessment (PMCA)

The Project Management Capability Assessment (PMCA) is a tool developed by the Canadian government to evaluate the project management capability of federal government departments and agencies. The model assesses an organization's capability across five levels, from foundational to optimizing. Each level reflects a higher degree of project management capability and maturity, and organizations can use the model to assess their current level of capability and identify areas for improvement [9].

The PMCA framework is based on five levels of capability maturity, which are:
1. Foundational: project management practices is inconsistent, with limited guidance or standardization.
2. Developing: the organization has begun to establish project management processes and tools, but these are not yet fully integrated or standardized.
3. Performing: the organization has established formal project management processes and systems that are consistent across the organization.
4. Managed: the organization has a well-established project management culture that is integrated with other organizational processes and systems.
5. Optimizing: the organization is continuously improving its project management practices and processes, with a focus on innovation and best practices. Project management is fully integrated with other organizational processes and systems, and there is a strong culture of project management excellence.

The PMCA assessment process can help to identify skill gaps and training needs within an organization, and can be used to develop targeted training programs [9]. The PMCA is based on a set of core competencies, which include project management processes, project governance, project planning and control, project risk management, project human resource management, and project procurement and contract management [10].

2.4 Management Capability Index (MCI)

One tool that can be used to measure management capability is the Management Capability Index (MCI). The MCI is a framework for evaluating the effectiveness of an organization's management across multiple dimensions and it provides an overview of the health and maturity of a company's management, helping it to identify strengths and improvement opportunities. So far, many countries have developed their own MCI, such as Malaysia, Australia, Macau and India [11].

The MCI was created in 2003 by the New Zealand Management Institute and measures leadership and competencies by converting managerial performance assessment into an index that ranks companies in ten different skill areas, giving a score between 0 and 100 [12]. However, different organizations may have different priorities or areas of focus when it comes to evaluating their management capabilities. Therefore, an organization may add or eliminate certain categories by adapting the MCI to fit their own needs and to identify areas for improvement.
The ten categories that indicate the final degree and the corresponding weights are shown in Table 1 [3].

Tab. 1 - Ten Major Categories and Corresponding Weights

	Category	Weights
1	Visionary & Strategic Leadership	15%
2	Performance Leadership	10%
3	People Leadership	10%
4	Financial Management	10%
5	Organization Capability	5%
6	Application of Technology and Knowledge	5%
7	External Relationship	5%
8	Innovation - Products & Services	10%
9	Integrity & Corporate Governance	5%
10	Results & Comparative Performances	25%
	Total	100%

3. Research Methods

The research methods of this paper involved a comparative review of the different models for measure management competencies, such as Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI), Project Management Capability Assessment (PMCA) and Management Capability Index (MCI). The databases used were Google Scholar, Web of Science (WoS) and Scopus.

The literature review will compare these models, by analyzing their general strengths and

weaknesses. For this, a table of the strengths and weaknesses of each model was created based on the literature review.

4. Results and Discussion

The process maturity model and the management capability index are both frameworks that organizations can use to assess their capabilities and identify areas for improvement. Table 2 shows the strenghts and weaknesses of each model.

The Management Capability Index (MCI) is a model that assesses the management capabilities of organizations based on ten dimensions. In contrast, the Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI), and Project Management Capability Assessment (PMCA) are models that assess the maturity of specific processes within an organization, such as software development, project management, or risk management.

The CMM is a process improvement approach that helps organizations improve their software development processes. Its strengths lie in its focus on continuous improvement, defined process areas, and clear levels of maturity. However, it has been criticized for being too rigid and not easily adaptable to different contexts.

The CMMI is an extension of the CMM and incorporates other areas of software development, such as systems engineering and supplier management. Its strengths include its ability to improve communication and collaboration across different areas of software development, as well as its flexibility in adapting to different contexts. However, it can be complex and time-consuming to implement.

The PMCA is a tool used to assess an organization's project management capabilities. Its strengths include its ability to identify areas of improvement and provide guidance for implementing changes. However, it is limited in its focus on project management and may not be suitable for assessing overall management capabilities.

The MCI is a model developed by the New Zealand government to measure the management capabilities of public sector organizations. Its strengths include its focus on strategic leadership, organizational culture, and performance management.

While the MCI focuses on overall management capabilities, the CMM, CMMI, and PMCA assess specific processes related to a particular area of an organization's operations. These models can be used in conjunction with the MCI to provide a more comprehensive evaluation of an organization's capabilities.

Additionally, the MCI and the CMM, CMMI, and PMCA have different assessment frameworks, with the MCI focusing on self-assessment and the other models using an external assessor. The MCI is also more flexible, allowing organizations to tailor the assessment to their specific needs, while the other models have a more standardized approach.

There may be some strengths and weaknesses that are similar across the different models. For example, one strength that may be common to all models is that they provide a structured framework for assessing management capabilities. On the other hand, a weakness that could be common to some models is that they may not take into account the specific context or industry in which the organization operates.

Tab. 2 – Strenghts and weaknesses of the models

	Capability Maturity Model (CMM)	Capability Maturity Model Integration (CMMI)	Project Management Capability Assessment (PMCA)	Management Capability Index (MCI)
Strenghts	Provides a structured approach to measuring and improving management capabilities	Provides a comprehensive framework for measuring and improving management capabilities.	Incorporates best practices from multiple industries and disciplines.	Provides a simple and easy-to-understand measure of management capabilities.
	Helps organizations identify areas for improvement and prioritize efforts	Covers a broader range of capabilities than the CMM.	Provides a detailed assessment of an organization's project management capabilities.	Can be used to compare organizations across different sectors and industries.
	Allows for compatisons with other organizations using the same model	Incorporates best practices from multiple industries and disciplines.	Helps identify areas for improvement and prioritize efforts.	Can be used as a benchmarking tool to identify areas for improvement.
Weaknesses	Can be time-consuming and resource-intensive to implement	Can be complex and difficult to implement.	May not address broader management competencies.	May not capture the full range of management competencies.
	May not be suitable for small organizations	May not be suitable for small organizations.	Can be time-consuming and resource-intensive to implement.	Can be limited by the quality of data available.
	Limited focus on the human aspects of management	Can require significant resources and expertise to implement effectively.	May not be suitable for small organizations.	May not provide enough detail to identify specific areas for improvement.

5. Conclusion

In conclusion, the process maturity model and the management capability index are both frameworks that organizations can use to assess their capabilities and identify areas for improvement, but they have different focuses and approaches. The process maturity model is more focused on improving processes and can be helpful for organizations looking to optimize their operations, while the MCI is broader and can be helpful for organizations looking to improve their overall management capabilities.

Ultimately, the best approach for an organization will depend on its specific needs and goals. It may be helpful to use both frameworks in conjunction to get a more comprehensive view of the organization's capabilities and identify areas for improvement. It's important to note that strengths and weaknesses can also vary depending on the specific version or implementation of each model, as well as the organization using it. Therefore, it's important to carefully evaluate the strengths and weaknesses of each model in relation to the specific needs and characteristics of the organization.

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