Organizational Aspects and Practices for Enhancing Organizational Project Management Maturity

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Abstract: An organization's performance in a project is determined by its ability to implement project management knowledge and practices. This ability reflects the organization's level of project management maturity (PMM). PMM is premised on the belief that the higher the PMM level, the higher the ability to successfully deliver a project. With this in mind, the current paper aims to determine the type of organizational aspects and practices that could influence the success of PMM implementation in organizations. For this purpose, a systematic literature review (SLR) was performed on 23 articles published between 2011 and 2021 that studied PMM. The findings showed that most articles stressed organizational culture and integration with strategic organizational initiatives. Among all the studied industries, the information technology industry stood out. Content analysis was used for analyzing data, which were thematized using ATLAS.ti. Ten sub-themes emerged, with six sub-themes under organizational aspects and four sub-themes under organizational practices. These sub-themes, which were intertwined with the implementation and growth of PMM in organizations, positively impact project delivery performance. Based on this, several future research opportunities were proposed.

Keywords: project management maturity; project management maturity models; strategic initiatives; organizational culture; project complexity; integration mechanism; project management office; stakeholder differences; systematic literature review

1. Introduction

Most organizations use projects to achieve their strategic business objectives [1], and the success of each project is critical for fulfilling organizational objectives. Accordingly, project management has become an important strategic discipline for organizations to follow to deliver successful projects [2]. However, despite the global advancements seen in project management, the success rate of organizational projects has been stagnant [3]. Evidence has shown that successful projects are strongly correlated to the organization's project management capability; when an organization's project management ability is high, its success rate increases. Project Management Maturity (PMM) is an important tool for organizations to determine their project management capabilities.

As an indicator of an organization's ability to perform certain tasks, PMM is used to make continuous improvements [4,5]. Its model, the Project Management Maturity Model (PMMM), is a systematic framework used to assess and evaluate the organization's current ability level [6]. PMM works on the premise that the higher the organization's project management maturity, the higher the organization's ability to successfully deliver a project [7].

Continuous improvements form the foundation of the relationship between organizational performance, project management, and project management maturity [5]. PMM and its models are one of the strategic improvement initiatives to increase the project success rate. While projects are critical to an organization's sustainability [1], project management processes and practices are common in organizations, particularly in large and complex projects [3]. On the other hand, organizations rely on successful projects to achieve their intended business objectives. However, only capable and effective project management leads to a better chance of delivering a successful project [7]. Therefore, organizations adopt PMM as a strategic improvement initiative to increase their project management effectiveness and deliver a successful project.

Despite the many available models, the objectives and construct of the PMMM are the same as its predecessor, Capability Management Maturity Integration (CMMI). CMMI was developed by the Software Engineering Institute in the late 1980s. It aimed to increase the success rate of information technology (IT) projects [8] but was widely used in other services, including project management, risk management, and personnel management [9]. The success and popularity of the CMMI led to the existence of more than 30 models in the market today [10,11].

As shown in Appendix A, the development of the PMMMs was based on a similar objective: to assess the organization's project management competence and capability and "to classify it along with a number of maturity levels" [8]. Another similarity is that the PMMMs were built on two-dimensional structures [12]. The first dimension focuses on the level of maturity, while the second focuses on the critical aspects of the project management knowledge area [13]. Two levels of maturity exist: the continuous level and the discreet level. The former consists of common language, common processes, singular methodology, benchmarking, and continuous improvements [14]. The latter comprises step-like levels of maturity [15]. The models are diverse. One established model is Kerzner's Project Management Maturity Model (KPM3 Model). It is often used at the continuous level to assess organizational maturity [16]. Another established model is the PM Solution, PMMM.

While the PMMM uses a discrete five-step-like maturity progression, the other two models adopt knowledge areas from the Project Management Body of Knowledge (PM-BoK) issued by the Project Management Institute (PMI) [17]. This serves as a basis for the focus areas of the assessment. The PMM is a critical framework used in project management to enhance an organization's project management maturity and, hence, its project delivery performance.

Some organizations use the PMMM to assess, evaluate, and directly define the maturity of their area of interest. Such organizations also can quantify their ability to manage their projects successfully. The PMM describes the organization's development processes to reach a desired future state [11]. Based on these promising benefits of the PMM, a continuous study of the PMM, and its associated models, is needed to uncover what organizations need to consider when adopting PMM. This knowledge could hasten the implementation process, allowing organizations to execute their projects more successfully.

The organization's level of project management maturity is determined by the "availability or degree of occurrence of single aspects of the project management structures" [8]. This concept assumes that a higher PMM level leads to better project management performance, increasing the success rate [18].

Current organizations adopting the PMM and its PMMMs expect to gain benefits and improve their project delivery. These benefits include the successful implementation of the PMM, improvements in their project delivery, and an improved organizational reputation [19]. Previous studies [19] have found that an organization's reputation is built on consistently delivering successful projects, thereby achieving its intended business goals, such as increasing shareholder value. Other studies [20] have found that mature organizations have a significantly better performance when compared to immature organizations in terms of the ability to effectively fulfill customers' needs. Other studies [21] have observed

that one strategic way for organizations to improve would be to develop a close relationship with the PMM constructs. This may be costly in terms of resources, commitment, investments in software and licenses, consultant fees, and expenses for training, but there are significant benefits to be gained [22].

Previous studies suggest that PMM and its associated constructs lack a theoretical foundation, and most of the existing models were developed based on the continuous improvement concept [23]. As shown in Appendix A, the three examples of models demonstrate their relevance for contingency theory (CT) and dynamic capability. The CMMI and PM solution, which use PMMM's elements and constructs, demonstrate a strong ability, which needs to be extended based on the organization's "best practice, and its ability to integrate and reconfigure internal and external competencies" [24]. KPM3 was developed based on its critical success factors. As suggested by CT [25], the alignment of these elements with the project environment may lead to it fitting within the organizational aspects and practices, thus leading to an improved performance. This preliminary analysis suggests that existing models were developed based on multiple theories. This SLR may confirm this finding.

Studies have noted that low-level project management maturity was significantly related to poor project performance [26]. Previous global surveys conducted by industry researchers, such as the PMI and PricewaterhouseCoopers (PwC), have shown a lack in key focus areas. For instance, scope management contributed to poor project performance. The PMI survey also noted that low levels of project management maturity contributed to an average of 9.9% of dollars wasted for every billion dollars invested in development projects [1]. The highest occurrence was detected in projects implemented in Australia, where 13.9% of the cost was wasted for every billion dollars that were invested. The survey further indicated that the main reason for this was the inaccuracy of the gathered requirements. This illustrates low-level project management maturity, leading to poor project performance. A survey conducted by PwC found that high levels of poor project performance resulted from low levels of project management maturity. This was due to the project's failure to establish a proper project management methodology [27]. According to Kerzner Project Management Maturity Model (KPM3), the inability to identify a project management methodology is categorized as "common language", forming level one out of five maturity levels. At level one, organizations merely have a "good understanding of the basic knowledge of project management" [16]. Based on previous studies, it has been noted that successful implementation of the PMM increases organizational capabilities regarding project delivery, leading to organizational success [28].

Although PMM and its model have progressed since their inception in the late 1980s, the number of publications has decreased since 2014 [29]. PMM and its models, according to Pells [29], have become a "hard sell" in the industry. One of the reasons for this is that executives are unwilling to be assessed and evaluated, and to make their organization's results public, particularly to existing and potential clients.

Another reason for this decline is a lack of flexibility and practical methodology. Previous articles have brought attention to the ongoing problem of PMM and its models. Many previous researchers have identified PMM and its models as having ongoing issues, such as a lack of flexibility [30], a lack of practical methodology [31], and a lack of knowledge about the critical aspects of maturity assessments [22]. Backlund [22] indicated that the lack of empirical research in this area resulted in a lack of knowledge about which aspects are critical.

Research Questions

This SLR aims to uncover the critical organizational aspects and practices to assess and evaluate project management maturity level. The findings from this SLR may assist PMM model developers in improving existing models to become more flexible in their implementation. This knowledge would benefit organizations aiming to implement PMM

as part of a larger initiative to successfully enhance their project delivery. The outcome can contribute to the effective implementation of PMM. The research questions are as follows:

1. What organizational aspects could influence the implementation of PMM in organizations?
2. What organizational practices could influence the success of PMM implementation?

This SLR may develop the maturity of the body of knowledge regarding project management if it successfully answers the above research questions. Based on the ideal concept of project management maturity, as suggested by Albrecht and Spang [23], this SLR offers the most critical organizational aspects and practices when assessing maturity. Organizational aspects and practices can broaden contingency theory (CT) to achieve fit conditions between the project management system and the project environments. In practice, this SLR may contribute in two ways. First, it can provide a reference for PMM model developers to improve existing models and make them more practical and flexible. Second, it can enable practitioners to identify existing organizational aspects and practices to determine whether the organization is ready to adopt and implement the PMM model. These actions have the potential to restore PMM value.

2. Methods

This paper employed a systematic literature review (SLR) as a research method to learn about the aspects and practices with the potential to enhance organizational project management maturity. The SLR was fortified by a bibliographic analysis that provides a holistic view of the necessary information about PMM. The SLR reveals the breadth and theoretical background of the examined topic [32]. Previous studies have proven SLR's success in answering research questions in various fields of study [32–34]. This success is because the previous studies strictly followed the SLR's established protocol [35,36]. This SLR follows a similar method. SLR could uncover more areas of the PMM, and the finer details of how it can successfully be implemented.

2.1. Study Design

The SLR was conducted following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement. PRISMA is a published standard method, applied to reviews [33,35,36]. Before qualitative synthesis and content analysis, PRISMA was used to identify, screen, and assess the eligibility of the articles [37].

2.2. Eligibility Criteria

The SLR applied in this work only considered studies that fulfilled the following criteria: publications between 2011 and 2021, articles published in English, and a focus on project management maturity. Table 1 further illustrates the inclusion and exclusion criteria.

Table 1. The inclusion and exclusion criteria.

Criterion	Inclusion	Exclusion
Timeline	Articles published between 2011 and 2021	Any publication before 2011
Literature type	Journal (research paper)	Review paper, book, lecture, and conference
Language	Articles published in English	Non-English
Subject area	Project management maturity	Not project management maturity

2.3. Information Sources

Two databases, Scopus and ProQuest, were searched from August to September 2021. Although this was sufficient [38], Google Scholar [33] was also added to manually search for articles included in citations. Scopus has become a preferred source of information due to its robustness and broad coverage of journals in various fields of study [33,39]. Based on its website, Scopus covers 1814 journals focused on project management. Fisher and Newig [40] completed their SLR on the subject of sustainability transition using Scopus as

a single database. This SLR adapts the approach, based on previous successful studies that used Scopus as their primary information database.

2.4. Search

Table 2 shows the search string that was developed and used [36]. It encompasses "project management maturity," which was developed from the SLR's main topic. A total of 741 records were successfully retrieved from both databases. These records and abstracts were imported into Endnote version 20 for systematic archiving, storage, and document management [28].

Table 2. Search strings.

Database	Search String
Scopus	(TITLE-ABS-KEY ("project management maturity model") AND ALL ("project management maturity model"))
ProQuest	ti("project management maturity model") OR ab("project management maturity model") OR ft("project management maturity model")

2.5. Study Selection

Records were retrieved and screened to reduce the number of articles to a manageable size [36]. These were screened, and 51 duplicate articles [39] were removed using the 'Remove Duplicate' function in Endnote version 20's reference manager. The remaining 690 articles were further filtered using the inclusion and exclusion criteria listed in Table 2 [39,41], and the number of articles was reduced to 141.

A full-text review was performed of the 141 articles [33], and 19 articles were found to be suitable for data extraction and further analysis. Only articles that were specific to PMM, with original research data, were included. Consequently, 122 records were eliminated. These were not original research papers; they lacked empirical data, and the PMM models were discussed as a passing reference. Four articles were manually added from the reference search.

2.6. Risk of Bias across Studies

Evaluating the risk of bias is necessary to ensure the accuracy of the analysis, and this was assessed based on publication bias, selective reporting within studies, and conflicts of interest [35].

2.7. Data Extraction

The lead author reviewed all 23 articles, and the list of themes and sub-themes was iteratively generated. Themes encompassing Year of Publication, Authors, Country of Conducted Study, Objectives, Study Design, Sector, Participant's Characteristics, Data Collection and Analysis Methods, Main Results, Future Studies, and Authors' Conclusions were included using ATLAS.ti [42].

2.8. Primary Data Analysis

A qualitative content analysis approach [43] employed a quantitatively oriented aggregation technique to synthesize the qualitative and survey studies. From these studies, a descriptive finding was applied. The most important criterion for this SLR was that the findings were descriptive and they addressed the same subject [33], which concerns the adoption of the PMM and its associated models.

ATLAS.ti. was used to extract the findings, study implications, and future research. An inductive approach was applied to the first few articles [44] to develop the codes. In contrast, a deductive approach [45] was used in the remaining articles to extract the data for the coding process.

The commonality of these codes was then classified and reported as the sub-themes [33,39,42,46]. These were further classified into predetermined themes based on the research questions. Two reviewers reviewed the appropriateness of the proposed sub-themes. The consensus was used to resolve any disagreements. As a result, the main findings of this SLR were developed from the main and sub-themes. The 'frequency effect sizes' were used to present the magnitude of each finding [33]. This was calculated by dividing the number of articles citing a particular theme by the total number of articles (23).

3. Results

3.1. Study Selection

Following quality assessment, 23 articles were identified for analysis, as shown in Figure 1.
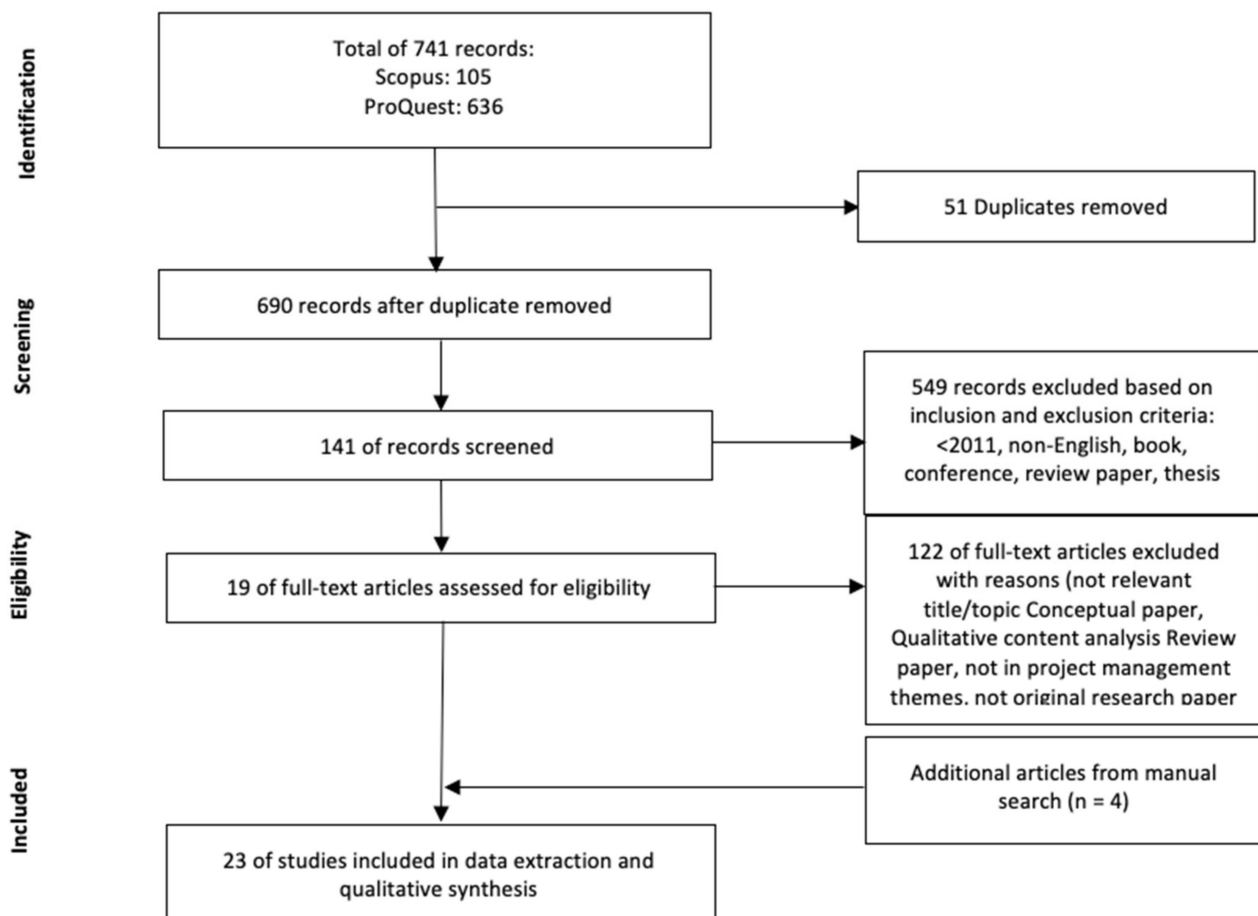
Figure 1. Study workflow [35]. A total of 741 records were identified. After screening, 141 full-text articles were assessed for eligibility. Ultimately, 23 articles were included.

3.2. Study Characteristics

It appears that quantitative studies were more common, with the highest number of such studies being conducted in 2014, amounting to four studies (Figure 2). Qualitative and mixed methods were consistently used between 2012 and 2018, with mixed methods being more consistently applied [34] to gather richer information. No qualitative studies were noted from 2019 to date.
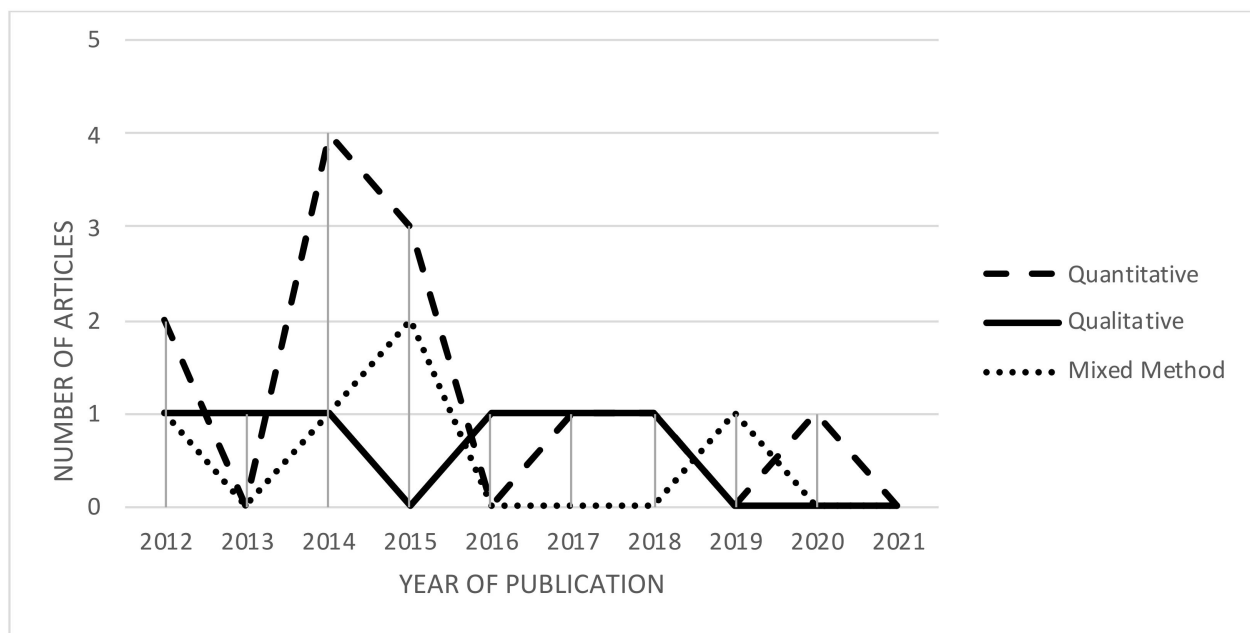
Figure 2. Distribution of methods applied (2012–2021).

　　　Most articles on PMM were published between 2012 and 2020, with the highest number being noted in 2014, totaling six articles (Figure 3). This can be attributed to the Special Issue for project management maturity publications offered by the *International Journal of Managing Projects in Business* [47]. Four articles were published in 2012, five were published in 2015, and only one was published in 2013, 2016, 2019, and 2020. For 2017 and 2018, two articles were published, respectively. There were no publications for 2011 and 2021.
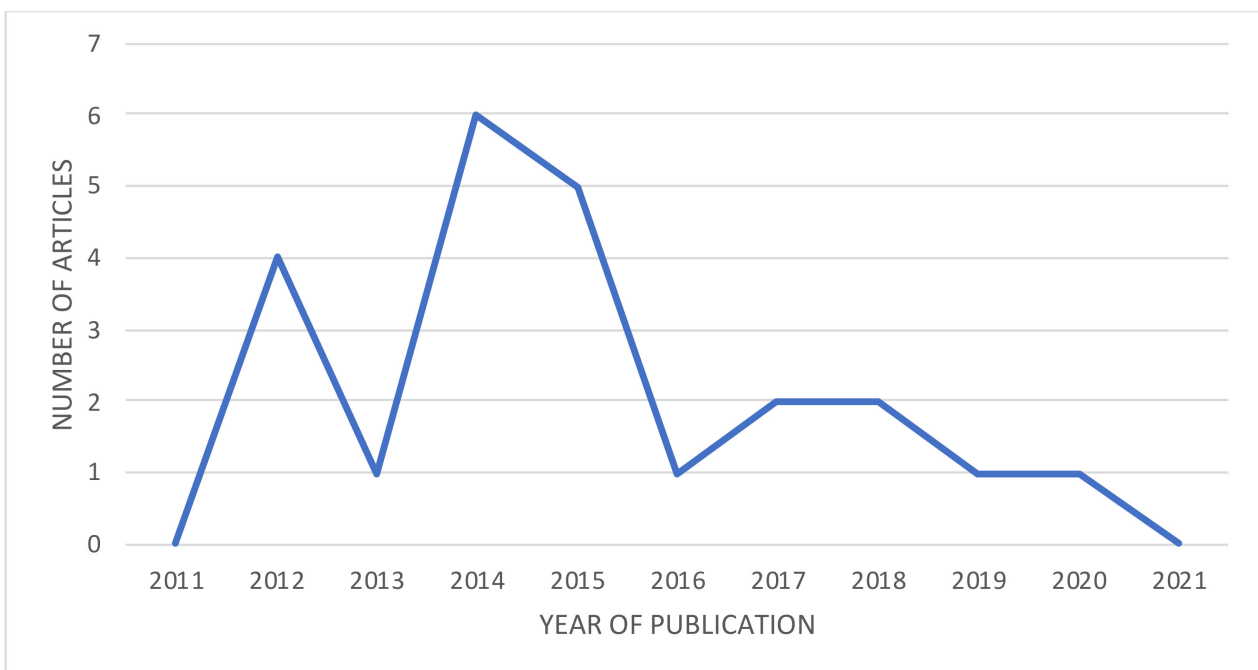
Figure 3. Year of publication.

　　　A total of 23 articles were selected from 16 journals, with the highest number of articles being found in the *International Journal of Managing Projects in Business*, totaling six articles. This was attributed to the Special Issue published in 2014. Three additional articles

were selected from the *Applied Mechanics and Material* journal. The remaining journals contributed only one article each (Figure 4).
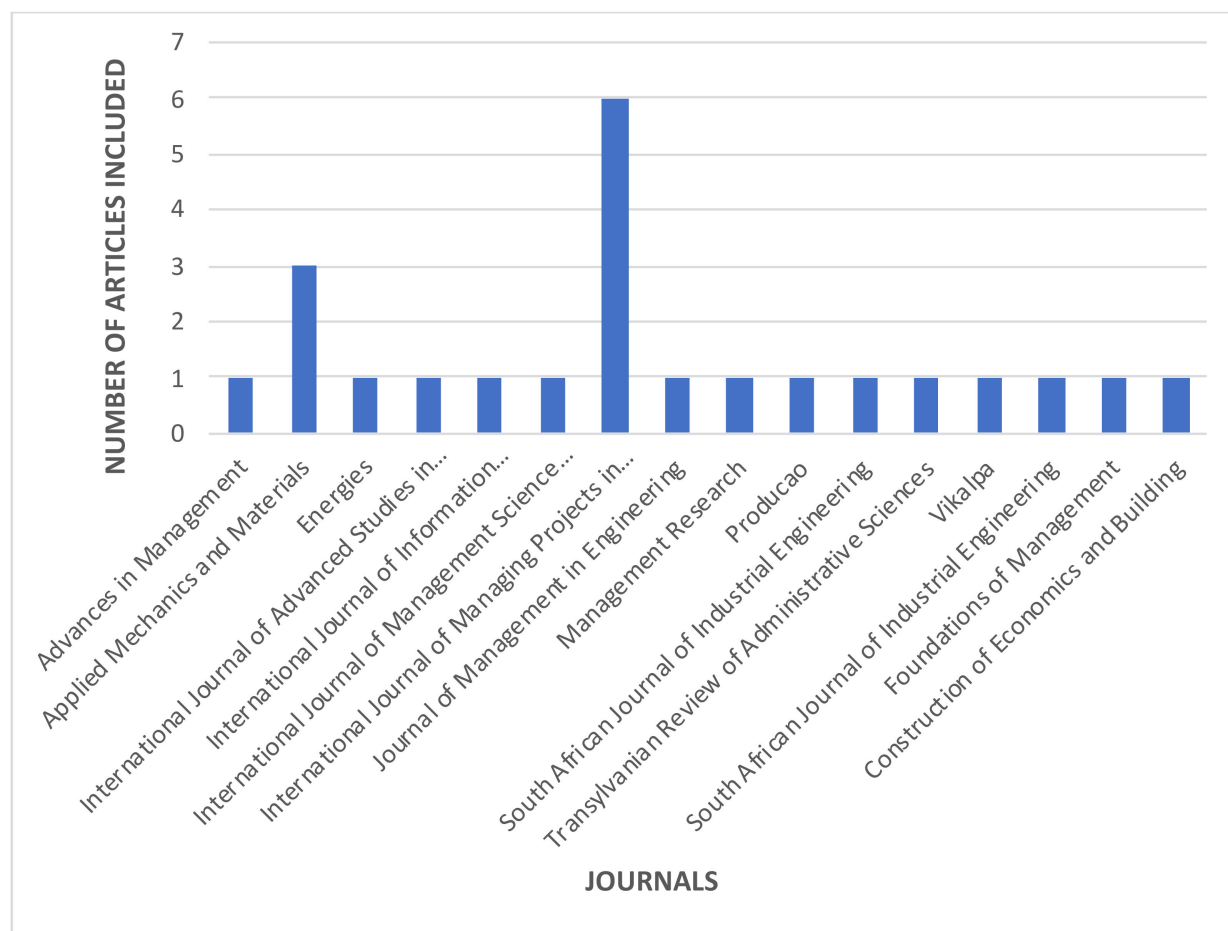
Figure 4. Journals of publication.

3.3. Risk of Bias across Studies

In this SLR, no studies were excluded due to the possibility of bias. There was also no mention of the researcher's influence on the studies. Overall, the quality of the survey studies was moderate, with the majority providing justifications for the research questions and samples. A few, however, omitted sample size. Most qualitative studies demonstrate a clear link between the research methods and questions, data-collection methods, data representation, and data interpretation.

3.4. Research Design Used by Previous Studies

All the research methods used to address the research questions and objectives in all the articles were reviewed. Mixed methods were less applied to study the PMM and its associated models, particularly in the earlier years. Mixed methods were mainly used to include more participants, leading to larger amount of data, including statistical data and selective interviews. These offered a more in-depth look at the data, thus providing more substantial implications and richer descriptive terms [48]. Table 3 illustrates the information regarding the articles included in this review.

Table 3. Study characteristics.

Author(s)	Study Design	Sector	Type of Participant	No of Participant
[30]	Mixed methods	Private—Engineering Companies	Project Manager	15 qualitative 13 quantitative
[23]	Qualitative	Private—Automotive and Energy	Project Manager, Head of Department	6 (2 interviews per case organization
[22]	Mixed methods	Private—Engineering and Construction (Mining)	Top Management, Project Manager Project Coordinator Managers	6 interviews 67 respondents, survey 9 respondents, visit and interview
[20]	Quantitative	Private—Information Technology	Project professional	51 respondents
[49]	Quantitative	Private—Information Technology	Project Manager	16 firms
[50]	Qualitative	Private—7 Multi organizations	Professional	90 respondents
[51]	Qualitative	Private—Automotive	Managers	14 respondents
[52]	Qualitative	Private—Manufacturing	Engineering laboratory	Not applicable
[53]	Qualitative	Private—Facility Construction	Head of Department	Not mentioned
[34]	Mixed methods	Private—Information Technology PM Consultancy	Senior IT Project Manager	18 interviews 190 survey respondents
[54]	Quantitative	Public—Government Agencies	Project Manager PMO staff	128 respondents
[50]	Mixed methods	Private—Information Technology	Project Manager Engineer Director IS IT Manager	41 respondents
[55]	Quantitative	Private—Energy	Project management practitioner	75 respondents from 75 organizations
[56]	Mixed methods	Public—Education	Course developer Instructional designer Sponsor Subject matter expert Unit/dept. head	10 members from two universities
[57]	Quantitative	Private—Facility Construction	Excellent project manager High-level business executive	238 respondents
[58]	Quantitative	Public Agency	Project manager Team member	65 respondents
[59]	Quantitative	Private—Multiple	Project manager	78 respondents
[60]	Quantitative	Public– Government agencies	Secondary data	NA
[61]	Qualitative	Public Agency	Archival data	NA
[31]	Qualitative	Private—Information Technology (Infra)	CEO Program manager Project manager	From 1 organization
[62]	Quantitative	Private—Construction Engineering Petrochemical Mining	Project professional	225 respondents
[28]	Quantitative	Private and Public—Local/regional business Government/county office	Manager of small service business	66 respondents
[63]	Quantitative	Private—Facility Construction	Practitioner from 18 companies	Not mentioned

3.5. Main Findings

Themes and subthemes were developed based on thematic analysis. The lead author extracted a statement or piece of data that responded to two research questions. This process entails a detailed analysis of 23 articles using ATLAS. ti software. The lead author created meaningful categories via the coding method "according to the nature of the data" [39]. The lead author drafted a list of sub-themes based on a similar category. The lead author then divided these sub-themes into two main themes, derived from two research questions. This first draft was then further reviewed by two authors to check for relevancy between themes, sub-themes, and data. Multiple authors refined the draft through a collaborative review process.

Two themes emerged from the conducted analysis: organizational aspects and organizational practices, which influence the PMM implementation. A total of 10 sub-themes were further developed (Table 4).

Table 4. Main themes and sub-themes that influence organizational PMM.

Themes	No. of Studies (%)	Studies
Organizational aspects influence PMM		
Organization culture	6 (26)	[22,39,43,52,58,64]
Stakeholders' differences and priorities	5 (22)	[22,51,52,58,59]
Mature organization structure	4 (17)	[22,43,45,59]
Project complexity	4 (17)	[22,25,43,51]
Motivation	2 (9)	[22,56]
Pre-requisite for the next maturity level	2 (9)	[42,50]
Organizational practices influence PMM		
Integration with organization strategic initiative	9 (39)	[25,39,43,46,51,53,56,58,59]
Adopting PM reference	8 (35)	[20,22,50,51,56–59]
The establishment of Project Management Office	3 (13)	[49,51,56]
The use of project management software tools	2 (9)	[51,59]

3.6. Organizational Aspects Influencing Organizational Project Management Maturity

A variety of aspects determine the success of the PMM implementation in an organization. They include organizational culture, stakeholders' differences and priorities, matured organizational structure, project complexity, motivation, and prerequisites for the next level of maturity.

3.6.1. Organization Culture

According to previous research, the proper alignment of organizational culture with PMM improves project performance [34]. Organizations with adaptability cultures [56] and clan-type cultures [59] are likely to influence the PMM implementation, which leads to successful projects [62]. Although organizational culture significantly impacts project performance, previous research has not emphasized this [22]. As shown in Table 4, the SLR noted that organizational culture constituted 26% of PMM, suggesting its influential aspects regarding the adoption and implementation progress of PMM in organizations. One study [56] also revealed a positive relationship between PMM and organizational culture. Organizations with high adaptability cultures can quickly adopt and implement PMM in their projects. This finding is particularly true in the educational sector. Since the environment in each sector differs, this finding could not be generalized to other industries. Nevertheless, previous studies have revealed that clan culture is positively correlated

with organizations' business performance, significantly impacting project performance. Organizational culture sets the foundation for determining the success of any integration initiatives. As shown in Table 5, this SLR revealed that organizational culture is critical to the organization's decision to adopt and implement PMM as part of its strategic initiatives in improving project performance. Thus, organizational culture is one of the most common organizational aspects influencing the implementation of PMM.

Table 5. Relationship between sub-themes with research questions and relevant theories.

Themes	Themes Relation to Research Questions	Contribution to Theory
Organizational aspects influence PMM		
Organization culture	High adaptability culture makes it easy to adopt PMM	Broaden CT: Organizational culture influences organizational flexibility to adopt initiatives for improvement
Stakeholders' differences and priorities	Stakeholders prioritize project deliverables rather than the enhancement of PMM	Broaden stakeholder theory (ST): Organization to balance and prioritize different stakeholders' expectations
Mature organization structure	A mature structure provides an ideal environment to adopt PMM	Broaden CT: Organizational structure affects the way the organization communicates and distributes its authority
Project complexity	Project complexity changes organizations' focus on the initiative to adopt PMM.	Broaden CT: Project complexity determined the effort made to achieve the intended fit condition.
Motivation	Major changes in an organization could disrupt motivation for the implementation of PMM.	Broaden dynamic capability: Motivation is a cluster of activities to build a strong organizational capability.
Pre-requisite for the next maturity level	Fulfil key processes, provide a better foundation to implement PMM	Broaden dynamic capability: Existing organizational practices are signature practices, building strong organizational capability.
Organizational practices influence PMM		
Integration with organization strategic initiative	PMM could be more beneficial when integrated with other existing strategic initiatives	Broaden dynamic capability: Core process in building strong organizational capability.
Adopting PM reference	Organization with existing PM systems could accelerate the PMM adoption process	Broaden dynamic capability: Practice building strong organizational capability.
The establishment of the Project Management Office (PMO)	The existence of PMO drives the implementation of PMM	Broaden Dynamic capability: Coordinating PMO is a coordinating function, one of the core processes in dynamic capability.
The use of project management software tools	Investing in PM software tools and training increases organizational maturity in managing projects	Broaden dynamic capability: Practice building strong organizational capability.

3.6.2. Stakeholders' Differences and Priority

From Table 4, 22% of previous articles widely discuss how stakeholders' differences and priorities could influence the implementation of PMM in an organization [22,55,56,63]. Previous studies also revealed that different groups of people involved in other projects require high competencies and skills to manage their differences. This demand is even more critical when projects have higher value and more significant investments, particularly those

related to national interest or global agenda, such as environmental projects. In this regard, such projects need project managers who can deal with the different interests of the various parties. As shown in Table 5, stakeholders who are likely to prioritize may be concerned about the technical deliverables and need for timely project delivery. However, they have less interest in improving organizational project management. As project management maturity improvement is not part of the project deliverables, these stakeholders' differences and priorities can alter the initiatives to adopt and implement PMM.

3.6.3. Matured Organization Structure

As shown in Table 4, 17% of previous articles suggest that a mature organization structure is likely to succeed when pursuing any improvement initiative. PMM levels are influenced by the maturity of the organization's structure. Large organizations, according to the studies, have a more mature structure, leading to higher levels of PMM [50]. Large organizations also have a functional [63], standardized, and formalized project management structure. This study found that respondents rate their project management's efficiency using these mature structures. Backlund and Sundqvist [22] also discovered that a mature organizational structure has more flexibility, allowing it to bring in more personnel when needed to successfully complete the project. Respondents tend to perceive high maturity due to the organizational structure's maturity. The literature also indicated that the current state of an organization's structure could determine its PMM implementation. However, not all existing organizational structures provide an ideal environment for the adoption and progression of PMM. This SLR noted that large and complex organizations were more prone to having formalized and standardized structures. As shown in Table 5, this sub-theme answers the research question, as mature organizational structures are ideal for the adoption and improvement of PMM.

3.6.4. Project Complexity

As shown in Table 4, this SLR found that 17% of previous articles recognized that project complexity could disrupt organizational improvement initiatives, such as PMM development [22,23,28,55]. Issues and problems in processing organizational improvement initiatives appear when project complexity increases. The type of project can also determine the complexity of the project. In energy projects, for example, the complexity of a project can increase due to the multiple activities that need to be completed simultaneously. Accordingly, the condition of energy projects becomes vulnerable to these changes [55].

Nonetheless, a well-defined project goal and method could reduce complexity [22,28]. It takes time before benefits the benefits of implementing PMM can be realized. Moreover, the progress of PMM implementation tends to occur at a steady pace. Progress could be disrupted when the project becomes more complex and more challenging. The cause of this disruption could be the type of project or the various activities involved in the project. Some projects take several years to complete. These projects are exposed to many changes, such as market price [55] and politics [61], increasing the project's complexity. Table 5 shows project complexity to be one of the organizational aspects for which high project complexity leads to more effort being required for the organizations to manage the projects. This causes organizations to deviate from their main focus and priorities when implementing PMM. Previous studies [55] have noted that this project complexity could impede the progress of organizational PMM.

3.6.5. Motivation

Another aspect of ensuring a continuous organizational improvement initiative is motivation. Improving the maturity of the organization's project management takes time; it is a long-term, ongoing effort. Previous research has found that the lack of commitment from both employees and management representatives was one of the reasons why many organizations have abandoned their improvement initiatives [22]. This lack of motivation could be due to major changes occurring in the organization, such as political changes,

acculturation, and merger processes [61]. These changes could disrupt and alter the initiatives' process. To implement PMM, organizations should take time to enhance the improvement process, including their human resources. To balance the momentum and the progress, organizations need highly committed staff and management. The success of PMM, just like other improvement initiatives pursued by organizations, depends on people's commitment. This commitment, however, could decline due to changes in the organizational structure caused by external factors. Table 4 shows that the successful implementation of PMM requires high commitment from all parties in the organization.

3.6.6. Prerequisite for the Next Maturity Level

Previous studies suggest that the current maturity level of organizational project management is critical in determining the implementation progress for PMM. A certain level of project management practices is an essential prerequisite for organizations, serving as a foundation for the adoption and implementation of PMM. Previous studies have proposed that organizations should have an existing project management process as part of their organizational practices [64]. In addition, organizations should fulfill key process areas, such as project management, knowledge management, and competitive intelligence [30]. As shown in Table 4, this sub-theme provides a solid foundation for the successful adoption and implementation of PMM, thus answering the research question.

Eleven articles (48%) analyzed by this SLR mentioned six organizational aspects that could determine the success and progress of PMM implementation. Before implementing PMM, organizations should assess each of the six aspects to ensure that they are aligned with the implementation. Table 4 shows that the organizational structure constituted 26% of the total, while other organizational aspects, such as motivation and prerequisites, constituted only 9%. Thus, future research could explore these areas in more depth.

3.7. Organizational Practices Influence Project Management Maturity

The progress of PMM implementation is reliant on organizational practices. Table 4 shows four major organizational practices that influence the progress of PMM implementation. These are: PMM integration with existing organizational strategic initiatives, the adoption of PM references, establishing a project management office (PMO), and PM software tools.

3.7.1. Integration with Existing Organization Strategic Initiatives

Organizations need to adopt one or more of the strategic management initiatives to remain competitive. Common initiatives include benefit management [55], environmental sustainability [28], knowledge management [34], and the PMM framework [65]. The implementation of PMM can be integrated with other strategic management initiatives, enabling organizations to achieve greater project successes [28,55]. This could be carried out integrating organizational resources allocation, realizing organizational goals, and organizational performance management. To materialize their organizational goals, the actual results of their project business must be integrated with PMM [23]. This would make PMM more valuable, as it can be "too rigid" when focusing on project management improvements [31]. Thus, coordination between PMM and other strategic initiatives needs to be enhanced. The successful coordination between PMM and other strategic management, particularly in mega-projects, could help organizations improve their maturity level [57]. Regardless of project size, well-established organizations tend to standardize the use of strategic initiatives when supporting their PMM improvement [63]. In brief, this SLR suggests that PMM is not only suitable for project management but also for organizational improvements. Nonetheless, previous studies suggest the need an important move to standardize all the requirements for the integration of multiple strategic management initiatives, including PMM [31]. Langston and Ghanbaripour [31] also found that a customized PMM based on the PDCA concept could help project management implement organizational strategies, which leads to project success. It was proposed that organizations use PMM

models to align various strategic management policies to optimize organizational performance. Proper alignment between PMM implementation and other existing organizational strategic management policies could improve projects and business performance [34].

However, not all forms of strategic management have a positive impact on PMM. Some drastic strategic management changes could have a negative effect on PMM implementation. For example, mergers and acculturation ((M&A) could have a positive or negative impact on PMM implementation in organizations [51]. In this case, the impact of M&A on PMM would depend on how the acquiree and acquirer "moderate the culture differences" [51]. Articles discussing the integration of PMM and strategic management constituted 39% of the total articles in this SLR. This intensity suggests that there has been extensive research on the integration of PMM and strategic management. Previous studies also revealed that the successful integration of PMM with other strategic management initiatives could lead to greater project success. However, drastic strategic management initiatives may negatively impede PMM's implementation progress.

3.7.2. Adoption of PM Reference

As shown in Table 4, 35% of the articles heavily discussed the adoption of the PM reference and the PMM models; it was thus deduced that this practice had a significant impact on improving organizational project management maturity. The PM reference and PMM models both served as a significant tool [64] and a valuable practice [31], ensuring the continuous improvement in organizational PMM. Previous studies have also noted the benefits gained from such a practice. This makes it a feasible approach, and it is supported by multiple organizations, including stakeholders [31]. Although some organizations benefitted from meeting project specifications and stakeholders' requirements [20,23], previous studies show that the adoption and application of the PM reference in IT project led to a positive performance, fulfilling project requirements and stakeholders' demands.

As the project management knowledge advances, there has been an increase in PM references and PMM models. This gives organizations a broader choice when selecting the best model to suit their projects. However, having too many PM references and PMM models can also be "problematic for PM practitioners" [22]. Nevertheless, previous studies have shortlisted the most common PM reference, and the PMM models that organizations adopt. The PMBoK was widely used as a reference and CMMI as a maturity model [20]. Capability Maturity Model Integration (CMMI) was developed in the late 1980s for IT projects and successfully improved these projects. Since then, CMMI has gained popularity, serving as a major reference for other PMM models available on the market today.

Apart from having an established PM reference, an organization may also use a self-developed PM system and maturity model. An earlier survey revealed that most organizations used their self-developed PM system and maturity model, positively impacting their project performance [27]. These organizations successfully increased their project success rate over time. Adopting an established PM reference and model or using a self-developed PM and model has a similar impact [23]. The most important concern is the characteristics of the established and self-developed PM reference and maturity model.

Previous studies noted that the project management knowledge area is important for the PM reference and maturity model. The self-developed PM reference must embrace all the core functions [62] or all 13 project management knowledge areas [63], as suggested by PMBoK. The core functions include integration management, scope management, time management, cost management, and human resource management. All have a positive impact on project outcomes [62]. The omission of these core functions, such as project planning knowledge, could result in a poor project outcome [55]. The Slovenian public project administration study found that public projects could not optimize its benefits due to the lack of human resource management and project planning methods [61]. With the

number of PM models available on the market increasing, PM practitioners may have difficulties identifying the most suitable model for their organization [22]. However, with sufficient training, PM practitioners will be able to select the PM reference and maturity model that is appropriate for their organizations [60]. Previous studies also reiterated that training [66] is one of the critical success factors. This means that all levels in the organization need to be trained in project management, because adequate training is the foundation for PMM implementation [66]. Several organizations in Argentina, Brazil, and Chile noted that financial investment in personnel training in project management had a positive and significant relationship with project success or failure. Thus, financial investment in training and capacity building should be prioritized when adopting and implementing PMM.

3.7.3. The Establishment of Project Management Office

This SLR detected a significant difference in the maturity level between organizations that practiced project management office (PMO) and organizations that do not have PMO. Previous studies found that organizations with an active PMO played a role in institutionalizing effective project management methodology, recruitment, and training of project personnel. They also had a higher project management maturity level, leading to higher project success rates [27]. A total of 13% of the articles in this SLR stated that the establishment of the PMO in organizations is a critical practice that can drive organizational PMM implementation and improvement. These articles revealed several examples of the PMO's function, which contributed to PMM. The PMO, as an independent function in the organization, consists of professional staff with the ability to perform strategic functions, such as communication management [54]. For organizations with multiple ongoing projects, the PMO centralizes the information obtained from each project; it can also manage reporting for the stakeholders. One of the most intensive studies looking at the effect of the PMO function on organizational PMM was conducted by Khalema, van Waveren, and Chan [54]. They divided the PMO functions into three levels: strategic level, tactical, and operational. At the strategic level, the PMO can effectively ensure that each project in the organization is aligned with the organizational strategic objectives. It also supports the organization's growth, and can provide effective and efficient knowledge management within the organization. PMO integrates the project initiatives and coordinates multiple projects to ensure knowledge-sharing across the projects. It further standardizes the quality of the project deliverables. At the operational level, the PMO is responsible for project evaluation. It develops the project evaluation process; it stages reviews, from business to technical reviews to feasibility reviews, and it ensures that all projects are conducted efficiently.

This SLR also indicates that the PMO must be equipped with full authorization and the ability to function well. It should be driven by an experienced professional. This type of PMO has been described by an earlier survey as a "front office" PMO role (PwC), constituting only a small portion of the total. At the same time, most of the respondents reported that the PMO, which functioned as a "back office" or coordinator between projects, was more effective. This was able to collect more information and report the progress to stakeholders. However, earlier studies suggested a strong relationship between establishing "front office" PMO and a higher maturity level for organizational project management [15].

One example illustrated how a government ministry's office used the PMO to manage its public projects. The ministry had to deal with various projects of long durations, large budgets, and many participants in energy development projects. Some of these projects were formed under a coalition of two governments. A government project office (GPO) was thus developed to manage and coordinate such projects effectively. The GPO had a similar role to the "front office" PMO [61]. It served as a centralized unit at the state level, providing the methodologies and system support to the ministry.

This strategic function had a positive relationship with the PMO because poor project-monitoring systems had resulted from underdeveloped PMOs. According to Mihic and Petrovic [55], the PMO must be matured and fully established to drive efficient implementations of its organizational strategy. This SLR thus concludes that PMOs must have the ability to play a strategic role to improve organizational PMM and the efficiency and effectiveness of the processes related to materializing business objectives. For this to occur, the PMO should be managed by experienced professionals, who understand project management and the organizations' overall process, including its culture and economic means. Investments depend on the PMO's abilities, based on how organizations conduct the projects (multiple projects and if the organization is based on projects or a project-based-organization) [67].

3.7.4. The Use of Project Management Software Tools

Project outcomes are influenced by project management software tools [63], such as MS Project, Primavera, and CA Clarity [55], which are mainly used by construction organizations. Mihic and Petrovic [55] pointed out that poor project outcomes were caused by poor skills and inadequate training in project management software tools. This means that organizations need to invest in project management software and staff training to improve their project outcomes.

Integrating PMM with existing organizational strategic management, adopting a PM reference and its maturity models, creating a PMO, and using appropriate project management software tools are beneficial to the development of an organizational PMM, particularly organizational performance.

4. Discussion and Conclusions

Organizational aspects and practices are significant elements of project management maturity. This paper has presented a systematic literature review of previous studies examining organizational aspects and practices that could influence the implementation of PMM. The authors analyzed 23 articles supported by ATLAS. ti. The authors answered two research questions and thematically described the findings.

As shown in Table 4, this SLR identifies six organizational aspects that influenced PMM implementation:

(a) Organizational culture;
(b) Stakeholders' differences and priorities;
(c) Matured organizational structure;
(d) Project complexity;
(e) Motivation;
(f) Prerequisites for the next maturity level.

From the SLR, it can be deduced that organizational culture plays a significant role in determining the organization's motivation to adopt and nurture PMM's progress and implementation. Organizations with high-adaptability cultures tend to accept and quickly realize the benefits of implementing PMM. However, it should be noted that a high-adaptability culture was only observed in the educational sector. The aspect of motivation as a prerequisite for the next maturity level had less coverage in previous studies, although it had a significant function in successful PMM implementation. Motivation is crucial for ensuring the consistent commitment of the respective parties. This ensures that PMM is not abandoned halfway through its implementation. Identifying prerequisites for organizations to reach a higher maturity level is important because they serve as a solid foundation, setting organizations on the right track. They also allow for organizations to accelerate their PMM implementation. All six organizational aspects are essential.

As shown in Table 4, this SLR also identifies four organizational practices that could lead to the successful adoption and implementation of PMM:

(a) PMM integration with existing organizational strategic initiatives;
(b) The adoption of a PM reference;

(c) The establishment of the PMO;

(d) The use of PM software tools.

The above six organizational aspects and four practices could fill the gap in PMM, as identified by [22]. These organizational aspects and practices can be used when assessing organizational project management maturity. Practitioners should consider these aspects and practices to improve PMM and organizational performance.

Previous studies have criticized PMM and its associated models for lacking practicality [22,30,31] and a theoretical foundation [49]. This SLR has identified six critical organizational aspects to enhance the maturity of organizational project management, thus providing a foundation for PMM improvements. Table 5 illustrates how these aspects address the research question and broadens three related theories.

CT emphasizes the fit between the organizational aspects and the external environment [25]. From Table 5, a mature culture and structure provide ideal conditions for the organization to undertake any improvement initiatives. Meanwhile, project complexity is an external condition that challenges an organization's abilities. This SLR demonstrated that a mature organization structure and a high adaptability organization culture allow for an organization to adapt to project complexity. Therefore, these enable the organization to achieve suitable conditions. This finding broadens CT, in which a mature structure and high-adaptability organization culture ensure that the organization is highly flexible, and can adapt to the external environment, offering it higher chance of achieving suitable conditions and leading to a more successful performance.

Earlier studies linked project management with stakeholder theory (ST), focusing on how stakeholders strongly influence the project [68]. ST suggests that organizations must have soft skills to balance and prioritize stakeholders' requirements. Table 5 shows that stakeholders' differences and priorities could deter organizational improvement initiatives. This SLR broadens ST, where multiple stakeholders prioritize project deliverables that benefit them rather than organizational enhancement.

Another two organizational aspects, motivation, and prerequisites for the next maturity level, are related to the dynamic capability framework, an alternative to the Resource-Based View (RBV) [24]. According to Shuen et al. [24], compared to RBV, a dynamic capability framework is more suited to explaining organizational capabilities in a dynamic market environment. As shown in Table 5, motivation and prerequisites to the next level maturity level are two features of the organization that develop strong organization capabilities. These are existing organizational aspects that provide an advantage to the organization when realizing improvement initiatives.

From Table 5, the four most common practices are critical to enhancing organizational project management maturity. The integration of PMM with existing strategic initiatives is an effective practice that increases the success of its implementation. This success increases project management maturity, thus increasing the ability to deliver a successful project. Meanwhile, adopting an established PM reference further accelerates the performance of PMM. The PM reference will introduce organizations to similar knowledge areas, which are elements of most PMM models. Thus, adopting established PM references is critical to enhancing project management maturity. An organization with a PMO seems to be more organized, with a clear drive to continuously improve organizational project management maturity. PMO functions as a facilitator who plans, introduce and selects appropriate project management practices that suit the organization. Lastly, investing in project management software tools is a valuable practice that could increase the effectiveness of organization project management when carrying out their work, including sharing project information such as project schedules. According to Shuen et al. [24], these four practices are core processes and practices that build a strong organizational capability. In addition, to answer the research question, these four practices also broaden dynamic capability.

What is novel about this paper is that the constructs to enhance organizational project management maturity derive from common organizational aspects and prac-

tices. Based on this finding, model developers may improve and customize existing models to make them more flexible and practical for organizations to adopt and implement. Instead of suggesting unnecessary new aspects and practices, this enhanced version should optimize existing organizational aspects and practices. This is in line with Albrecht and Spang's [23] concept of ideal maturity, in which the PMM model should be flexible and customizable to achieve the ideal maturity level for the organization. Similarly, CT emphasizes the fit between organizational aspects, practices, and project environments. This SLR broadens CT by identifying critical organizational aspects and practices to achieve a suitable condition that improves the organizational project performance. The finding also broadens dynamic ability, as organizational aspects and practices are identified as core processes and practices when building strong organization capabilities. This SLR suggests that the development and improvement of PMM and its models should be guided by multiple theoretical foundations, such as CT, ST, and dynamic capability.

Two limitations of this SLR should be highlighted for future improvement. The first is the limitations regarding the articles. This SLR was limited to articles published between 2011 and 2021 to explore the most recent common themes in project management maturity [32]. Second, this SLR did not consider any contemporary business models' management as a theoretical research foundation. Even though the PMM concept and earlier models were developed based on the idea of a continuous improvement management approach, it is worth revisiting this to find its relevance.

5. Implications for Future Research and Practice

This paper identifies the critical organizational aspects and practices that model developers can employ to improve the existing models. Based on this finding, a model developer may simplify the model by refocusing the elements and constructs of the existing model. This finding also fills a research gap identified by [22] by recommending aspects that should be considered when assessing organizational maturity. The implementation of PMM and its model could become more practical and focused, saving time and effort in the organization. Therefore, PMM adoption and implementation may not be seen as a burden to organizations in the future. In future studies, researchers could analyze articles published after 2021 to include more aspects, for example, the understanding of PMM and its success rate, and why such research was conducted. The future of PMM and its models could also be further pursued, including a search for alternatives to PMM. This SLR recognizes the emergence of the need to alleviate PMM's function as part of existing strategic initiatives in the organization. More research needs to be conducted to observe how PMM and its associated models can be used as a strategic integration mechanism between project management and the strategic management initiatives of an organization.

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Appendix A. Existing PMM Models and Relevant Theories

Author of the References	Elements Considered	Maturity Levels	Relevant Theory
Qin et al. (2017)	CMMI as introduced by SEI Four main elements: • Key practices; • Key process areas; • Maturity levels; and • Generic processes.	Level 1: Initial Process Level 2: Structured Process and Standard Level 3: Organisational Standards and Institutionalized Process Level 4: Managed Process Level 5: Optimizing Process	The foundation of CMMI can be explained by Dynamic capabilities (Shuen et al., 2014) Dynamic capabilities suggest that a strong capabilities are built on best practices and ability to integrate, and reconfigure internal and external competencies to address rapidly changes market.
Kerzner (2019)	Kerzner Project Management Model, KPM3 Based on critical success factors: • Corporate understanding of PM; • Executive commitment to PM; • Organisational adaptability; • Project manager selection criteria; • Project manager's leadership style; and • Commitment to planning and control	Level 1: Common Language Level 2: Common Processes Level 3: Singular Methodology Level 4: Benchmarking Level 5: Continuous Improvement	The foundation of KPM3 is another example of model that fit into Contingency Theory (Donaldson, 2001). KPM3 based on critical success factors and those factors needs to be aligned with to the project environment in order to achieve the most ideal capability, or fit condition.
Crawford (2001)	PM Solutions PMMM Project Management Maturity Model designed based on all nine of the PMBOK areas of knowledge.	Level 1: Initial Process Level 2: Structured Process and Standard Level 3: Organisational Standards and Institutionalized Process Level 4: Managed Process Level 5: Optimizing Process	The core process in strong capability is demonstrate in this model, thus the foundation of this model is relevant to Dynamic capability.

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