

Project Management Maturity Models

A structured comparison

Master Thesis

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Abstract

Project Management Maturity Models: A structured comparison

For centuries, companies and institutions are working on the development of organisational project maturity models. The purpose of these models is to develop a path for improving an organisation's capability of managing projects. Projects are the means by which companies implement their strategic objectives. Trends like globalisation and advances in IT lead to more geographically distributed teamwork. Therefore, this thesis gives a comprehensive answer to how project management maturity models address transnational project management.

For accomplishing the research objective, this thesis follows an integrated, qualitative literature review approach. Theoretical frameworks and applied research on project management maturity assessments were systematically collected and analysed. The results extracted from these two sources were synthesised to extract findings.

The main research result shows that models continuously adapt to transnational project management. They are doing this by aligning the organisational culture and values, focusing on organisational wide learning and gradually embedding behavioural and intercultural competencies. Maturity assessments need to follow this trend.

Furthermore, transnational convergence of the models' dimensions was observed. This development leads to growth in size and complexity. To apply them internationally, the models should be simplified or easily adapted to specific countries and cultures.

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List of Abbreviations and Symbols

APM	Association for Project Management
APMBOK	Association for Project Management Body of Knowledge
CCS-PMMM	Construction Consulting Service Project Management Model
ESPM3	Evolutionary Project Management Maturity Model
HR	Human Resource
ICB	Individual Competency Baseline
ICT	Information and Communication Technology
IPMA	International Project Management Association
KPMMM	Kerzner Project Management Maturity Model
MNE	Multinational Enterprise
OCB	Organisational Competency Baseline
OGC	Office of Government Commerce
OLAV	Online <i>Literaturabfrage</i> Vorarlberg (=online library of the University of Applied Sciences Vorarlberg)
OPM3	Organisational Project Management Maturity Model
OPMMM	Organisational Project Management Maturity Model
P3	Project, programme and portfolio
P3M3	Project, Programme, and Portfolio Management Maturity Model
PEB	Project Excellence Baseline
PM	Project Management
PM3	Project Management Maturity Model
PMBOK®	Project Management Body of Knowledge
PMCDF	Project Manager Competency Development Framework
PMI	Project Management Institute
PMO	Project Management Office
PMMM	Project Management Maturity Model
POC	Project-Oriented Company
PP&P	Project, Programme, and Portfolio
TQM	Total Quality Movement

1. Introduction

For years, hardly any management science has changed as much as project management¹ (PM). The development of project management reached from a tools and methods oriented approach towards a behavioural management discipline (cf. Gemuenden; Schoper 2015, p. 1). Nowadays, innovation is essential for companies to survive. Therefore, the largest part of their strategy consists of developing new products, services, or processes (cf. Aubry; Hobbs; Thuillier 2007, p. 332). Here, project management plays a central role by implementing a strategy, turning innovation into successful products, or helping to acquire new markets (cf. Wagner 2012, p. 47). Therefore, it is broadly accepted that projects are a company's instrument to implement strategic objectives aiming to achieve corporate goals (cf. Pennypacker; Grant 2003, p. 4; cf. Görög 2016, p. 1). Companies seeking to improve their ways of managing projects invest in several actions. These could be the creation of a project management office² (PMO), staff training programmes or the implementation of company-wide project management processes. The challenge is to evaluate them to ensure their effectiveness (cf. Ibbs; Kwak 2000, p. 32; cf. Tahri; Drissi-Kaitouni 2015, p. 171).

In the following sections, the topic around project maturity, project management maturity models (PMMs) and the significance of applying them internationally are outlined. This background is then used to formulate the research gap, the objective and finally the research questions. The description of the structure of this thesis is combined with the methodology in chapter 2. The terminologies used in this thesis are following conventions of PM.

1.1 Background

For the purpose of evaluating a company's capabilities towards project management, analysing its gaps and enabling cross-company comparisons, project management maturity models have been created (cf. Cooke-Davies 2004, p. 1235; cf. Khoshgoftar; Osman 2009, p. 297; Torres 2014, p. 16). Before building the research gap, it is important to understand the significance behind project management maturity (PMM) in relation to current trends on global level.

1.1.1 Defining Maturity in Project Management

If we look up *maturity* in the Cambridge Dictionary, it states “*very advanced*” or “*developed form of state*” (Cambridge Dictionary 2020c). The concept of project maturity was derived from the concept of process maturity. Process maturity traces back to the total quality management (TQM) movement in the 1980s. The principle is that a process becomes mature as it passes through the stages of being unstable, stable, and finally controlled and improved. Hence, a mature process is in a perfect state, constantly delivering predefined outcomes effectively and efficiently (cf. Cooke-Davies 2004, p. 1236, 2004, p. 1246).

¹ See Appendix B3.

² See Appendix B10.

If we define an organisation as a living entity, we can say that it has a lifespan and grows over time. It is learning from mistakes, or other best practices and every step forward is a development towards achieving more maturity (cf. Iqbal 2013, p. 458). Translated to project management, an appropriate definition of Kerzner is that:

“Project management maturity is the ongoing process of periodically identifying, measuring, implementing, and reassessing continuous improvement opportunities in the project delivery system and supporting infrastructure such that the organization can improve its ability to meet its strategic goals and objectives” (Kerzner 2019, p. 24).

Humphrey stresses that improving maturity is a long-term incremental process (cf. Humphrey 1992, p. 2). However, the definition of PMM is constantly changing. Upcoming trends like the agile movement or new technologies and tools force us to rethink (cf. Kerzner 2019, p. xi). Cooke-Davies tried to summarise the status of PMM. On the one hand, there is no universal agreement what extent of practices³ and processes are necessary to successfully manage projects. And on the other hand, capability and performance related to maturity carry a multiplicity of meanings (cf. Cooke-Davies 2004, p. 1245). Crawford summarised the current status around competences in project management and defined three different types. Firstly, *input competences* that are knowledge and skills (qualification and experience) that a person brings to a job. Secondly, *personal competence* that is a person’s capability to do a job. And thirdly, *output competence* that is the demonstrable performance that can be executed in the workplace. Hence, the competence of an individual derives from a set of attributes (knowledge, skills, attitudes) and proof of practical capability (cf. Crawford 2005, p. 9). Hereby, the Cambridge Dictionary defines capability as “*the ability to do something*” (Cambridge Dictionary 2020a) and competence as “*the ability to do something well*” (Cambridge Dictionary 2020b).

However, there is no general agreement on how the concepts that they signify apply to the general field of project management (cf. Cooke-Davies 2004, p. 1235). This seems to be the biggest criticism on PMM, as the structure of a model and the dimensions they address shape the “maturity” areas an organisation can reach (cf. Pasian 2011, p. 32). Anderson and Jessen complement the definition of project management maturity by stating that there will never be a fully mature organisation (cf. Andersen; Jessen 2003, p. 457). Nevertheless, it may not be decisive to rigorously know the exact level of maturity of a company, it is rather more essential to know and understand which steps will be necessary to bring the organisation forward. This leads us towards maturity models, which help to create a strategic plan with targeted actions to improve project management practices (cf. Crawford 2002, p. 3). The final goal is to utilise the assessment framework provided by the maturity model, compare its project delivery against best practices and other organisations in order to define a structured route for improvement (cf. Hillson, 2001, p. 1; cf. Pennypacker and Grant, 2003, p. 5).

³ See Appendix B3.

1.1.2 The Significance of PM Maturity Models on Organisational Level

In 1991, the Software Engineering Institute (SEI) created the Capability Maturity Model (CMM) to improve software development efforts (cf. Humphrey 1992, p. 7). It was developed since a single software issue allows multiple ways to deal with. The assumption was that Information Technology (IT) projects include far more unknowns and intangibles than projects in any other industry. Crawford stated that there are many similarities regarding complexities in software development compared to those within project management. Hence, the measurement methodology for an organisation's effectiveness in the field of software development was naturally adopted in general for project management. Crawford claims that there is a need to look at an organisation's "*complete picture of project management effectiveness, or project management maturity*" (Crawford, 2002, p. 2). Therefore, institutions went beyond the management of individual projects and created maturity models covering the "organisational project management". Cleland and Ireland indicated that organisational project management maturity models (OPMMMs) support the organisation and are leading to more efficient operations (cf. Cleland; Ireland 2006, p. 243).

Based on different studies, project performance is divided into project efficiency and effectiveness. Project performance is closely related to project success. Project success is traditionally measured by reaching technical project goals such as completing the project on time, with the right quality, and within the defined budget. Additionally, so-called soft goals such as reaching customer expectations and team satisfaction were introduced. While efficiency translates to traditional measures (goal achievement, time), project effectiveness is related to meet soft goals (cf. Yazici 2009, p. 18).

The overall goal is not just to deliver projects on time, or budget, but to ensure its value for the business (cf. Aubry; Hobbs; Thuillier 2007, p. 328). Aubry defines organisational project management as follows:

"Organisational project management is a new sphere of management where dynamic structures in the firm are articulated as means to implement corporate objectives through projects in order to maximize value" (Aubry; Hobbs; Thuillier 2007, p. 332).

In a similar vein, Kerzner stresses the importance of project maturity in strategic planning. He asserts that a PMMM needs to consider all aspects of a company including work relationships among employees and their management as well as their roles to the company structure⁴ and culture⁵ (cf. Kerzner 2001, p. 9). Also, Cooke-Davies indicates that project management incorporates two dimensions, a technical and a human dimension. While the technical component includes practices and processes integral to project management, the human component includes employees and their expertise. Both dimensions unite in a corporate culture that either promotes or inhibits project management practices. The importance of the human dimension "people and expertise" is especially relevant while managing large and complex projects including people with different national or cultural backgrounds (cf. Cooke-Davies; Arzymanow 2003, p. 472). The combination and balance between these components people/culture, processes, structure and systems determine the overall project maturity. The absence of one of those aspects will impact the overall

⁴ See Appendix B2.

⁵ See Appendix B1.

maturity level. Henceforth, an organisation having a great score in project management methodology but its workforce lack competence in project management will have an overall low score for maturity (cf. Nieto-Rodriguez; Evrard 2004, p. 4). The major concepts used on organisational project management level are defined in Appendix B.

Several studies have been conducted to find relationships between organisational project maturity and project performance with different outcomes (cf. Nieto-Rodriguez; Evrard 2004; cf. Mullaly; Thomas 2010; cf. Pretorius; Steyn; Jordaan 2012). One of the research findings concludes that the relationship between maturity and performance is stronger in complex projects compared to less complex projects. Facets of complexity can be team size, geographical dispersion of the project team, and the number of internal and external interfaces (cf. Albrecht; Spang 2014, p. 297). This might be caused by the fact that formalism and structure ensure proper integration of complex environments. Derived therefrom, companies with higher levels of maturity perform better in changing environments as it gives more stability to cope with change (cf. Lenfle; Loch 2010, p. 50–51; cf. Torres 2014, p. 139–142).

This opens the question where this complexity derives from. Therefore, the following section outlines the nature and trends of these complex environments.

1.1.3 Trans-nationalisation of Project Management

Nowadays, changes based on drivers like globalisation of markets (customers, competition), derived internationalisation of organisations and advances in information technologies are changing project management fundamentals (cf. Eriksson; Lilliesköld; Jonsson 2002, p. 53; cf. Zuofa Tarila 2017, p. 227). The decline of telecommunications and internet access costs, as well as the increasing availability of virtual world networks and tools encourage organisations to shift toward decentralised and networked structures. Further, organisations can employ talented resources from virtually almost everywhere in the world, as they can easily overcome barriers like geographical dispersion and travel costs (cf. Antantalmula; Thomas; Tell 2008).

This leads to the upcoming trend of trans-nationalisation of project management. It is a combination of global orientation and transnationalism. Global orientation comes from international management research and is defined as “...*the alignment of world markets with consistent standardized concepts*” (Gemuenden; Schoper 2015, p. 10). This results in homogeneous standardised products and processes and communication without considering local, lingual, or cultural differences. Transnationalism, on the other hand, is a general social phenomenon that emerges based on increasing interconnectivity among people. This goes along with increasing functional integration of cross-border relations of individuals, groups, institutions and states. This, in turn, is leading to growing international interaction in a new global space, which represents a key manifestation of globalisation (cf. Vertovec 2009, p. 2).

Trans-nationalisation of project management combines both approaches. This means that standardised concepts of project management processes (on individual, group and organisational level) are applied on a global level. Underlying consequences are structural changes from purely traditional co-located arrangement towards distributed, virtual settings

as well as an increasing variety of cultural backgrounds (cf. Zuofa Tarila 2017, p. 227). These circumstances prove an increasing demand for intercultural competences aiming to cope with different interests of diverse international project stakeholders⁶.

Trans-nationalisation of PM follows the objective of adopting global project management standards to local needs (cf. Gemuenden; Schoper 2015, p. 10–11).

1.2 Research Gap and Objective

The topic around PMMMs and the dimensions they address has grown since their introduction. To date, only a few integrative comparisons between PMMMs have been conducted. Those comparisons concentrate on a general view on organisational project management (Iqbal 2013; Farrokh; Azhar 2013; Khoshgoftar; Osman 2009; Berssaneti; Carvalho 2015; Souza; Gomes 2015). OPMM assessments usually focus on project management capabilities. These capabilities change over time, together with trends like globalisation or advances in information technologies (cf. Kerzner 2019, p. preface).

If we conclude on the background outlined, the assumption derived is that OPMMs play a significant role in improving project management in complex environments. An increasing complexity within companies can be identified when companies operate globally, with geographically dispersed teams. At the same time, project management is becoming increasingly international. Hence, these OPMMs are being applied across various nations, which implies the trans-nationalisation of PM in the form of standardised frameworks. In contrast, other studies found that effective leadership styles are contingent on culture (cf. House et al. 2004, p. xvii). However, at this point in time, it appears that there is limited knowledge on how maturity models address PM challenges on a global level. Furthermore, as employees also receive training based on outcomes of maturity assessments (cf. Cleland; Ireland 2006, p. 253), the need to address this question becomes ever more important.

The impact of culture on PM was already addressed by different scholars. For example, Yazici stated that organisational culture as driving force for achieving project performance (cf. Yazici 2009, p. 21). Humphrey already stated in 1993 that cultural changes are the main challenge behind achieving project management maturity (cf. Humphrey 1992, p. 2). Additionally, research findings by Carvalho show significant differences in project management in national environments (cf. Carvalho; Patah; de Souza Bido 2015, p. 1519). Hereafter, the hypothesis based on this assumed gap is, that existing models typically focus on processes and pay less attention to human aspects (cf. Pasion 2011, p. 33).

The identified research gap leads to the necessity for a detailed investigation on how OPMMs evolved in terms of aspects like culture and country. This requires analysing the whole picture. This includes frameworks as well as applied research on conducted maturity assessments. Therefore, this thesis aims to identify the main OPMMs with the purpose to conduct a detailed and structured comparison. A detailed description on the methodology is outlined in chapter 2. In contrast, it is not an objective to conduct a detailed analysis on

⁶ See Appendix B8.

how research results differ from an industry (e.g. manufacturing, construction, public sector, etc.) perspective.

1.3 Research Questions

Derived from the background, the research gap and the objective outlined, the main research question can be formulated as follows:

- *“How do recent organisational project management maturity models address the needs towards challenges of complex, intercultural project management?”*

Further, the main question is laying the basis for the following two sub-questions:

- *“What are the differences in terms of their creation date, in other words, from an evolutionary point of view?”*
- *“What are the differences between the selected maturity models in terms of their country of origin?”*

1.4 Motivation

The author’s motivation is based on the personal role as a global project manager in a multinational enterprise. This position provides insights in daily business, such as projects with delay and lack of quality of their results or too many simultaneous running projects, impeding more success for the company. Certain activities have been undertaken to improve project management within the last couple of years. Recently, an external company was hired with the purpose to analyse the company’s project management maturity. The author’s interest is based on observations of challenges attached to the current processes within the field of PM together with the author’s current academic international management and leadership studies. Especially, blending practical experience with the theoretical background from an international angle led to intrinsic motivation.

2. Methodology: Systematic Literature Review

An integrative literature review is especially relevant for topics that experience growth. With more than thirty models available, the literature on PMMMs is already in a mature stage (cf. Kerzner 2019, p. 27). Additionally, the identified research gap is challenging existing research with the yet unconsidered field of cultural aspects due to trans-nationalisation. At this stage, Torraco recommends the integrative literature review method (cf. Torraco 2005, p. 357). Therefore, this type of methodology was selected as a distinctive form of research to generate new perspectives into the chosen field of OPMM (cf. Torraco 2005, p. 356; cf. Randolph 2009, p. 2). This integrative literature review consists in reviews, synthesis and critique of pre-selected references on OPMM researches, with the objective to elicit data providing useful perspectives and supporting potential answers to the research questions (cf. Torraco 2005, p. 363). This approach is outlined in the following section.

2.1 Methodological Structure

This thesis is divided into seven main parts that follow an integrated, qualitative literature review approach as clearly described by Randolph (cf. Randolph 2009, p. 10). These steps are combined with the overall structure of this master thesis. The steps (in *italic*) are shown together with the structure in Figure 1, which directly references to each chapter number between brackets.

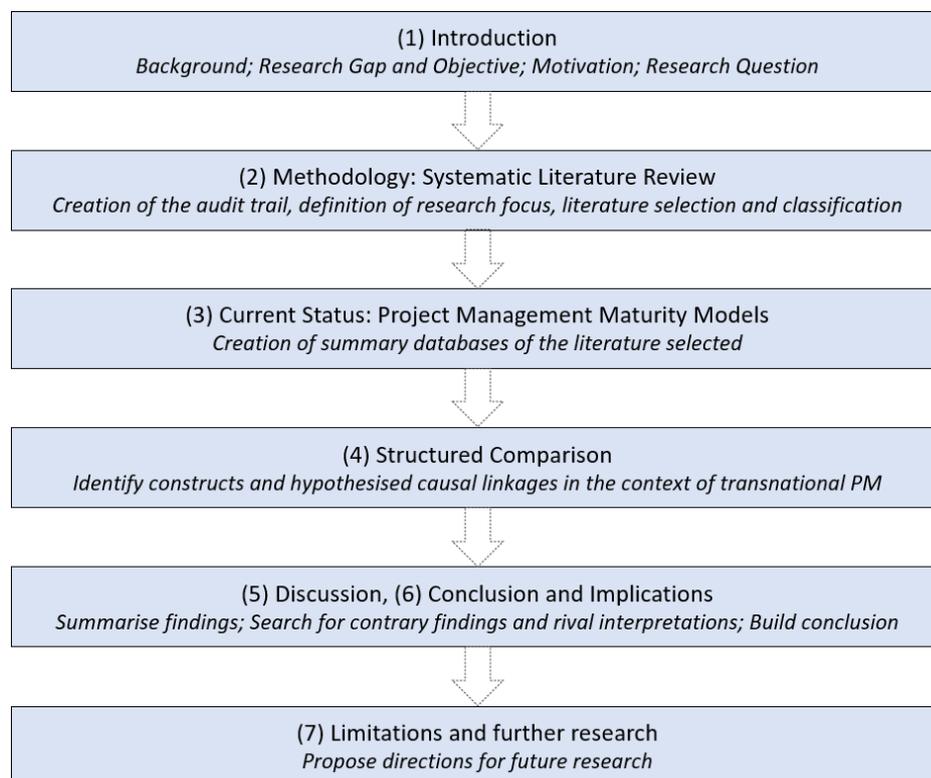


Figure 1 Structure of the thesis

Source: Own creation

The methodology section consists of the audit trail. The audit trail is the documentation of all steps taken in terms of literature collection and selection as well as of the literature

definition and classification. The reader needs to understand how the selection of relevant literature was conducted. This includes how it was obtained, which databases were used, as well as indications about recent literature and older literature (cf. Torraco 2005, p. 361). Therefore, the overview of the integrated literature review is a transparent discussion of the literature used (chapter 2, section 2.3).

A structured, integrated review on relevant OPMMMs leads to individual summaries (chapter 3). This includes the model definition (framework), the development and information based on applied research. The structured comparison utilises the summary sheet of each OPMMM and extracts dimensions that have an impact on project management in transnational⁷ environments. This chapter consists of the findings from the comparison (chapter 4). Constructs and essential themes that relate to trans-nationalisation project management are identified aiming to answer the research questions. Then, these findings are synthesised with existing research outcomes in order to answer the research questions (chapter 5). This includes a critical analysis as defined by Torraco (cf. Torraco 2005, p. 361-362). Based on the discussion about findings and rival interpretations a conclusion is drawn (chapter 6). The author's critical reflection on the study is conducted in the chapter of limitations that will finally lead to an outlook for future research (chapter 7).

2.2 Data Collection and Analysis

As stated above, this thesis follows the integrative literature collection⁸ and review approach based on Randolph (cf. Randolph 2009, p. 6–7). Google Scholar, the Wiley Online Library and the online library OLAV (*Online Literaturabfrage Vorarlberg*) of the University of Applied Sciences Vorarlberg were used to identify relevant project management maturity models and related research based on the following criteria:

- **Subject:** Maturity Models concentrating on organisational project management. There are several maturity models available that focus on different subject areas (e.g. processes, people, quality, etc.). Because of the defined delimitation of project management, all other subject areas were excluded from this master thesis on purpose.
- **Actuality:** The model was applied in research studies for not older than twenty years. This restriction is mainly applied due to a given time limit.
- **Comprehensiveness:** The comparison should include models developed in different countries of origins. Therefore, the author systematically excluded similar models developed in the same country based on the latest release published and/or practical relevance (e.g. published by an international acknowledged institute and used widely across countries).

In a first step, OPMMMs were identified utilising Google Scholar by using the keywords of "Project Maturity" and "Project Management Maturity Model", individually and in combination. The objective of this first step was to gain a comprehensive view of maturity models available. In a second step, referenced sources in the literature collected were used to gain further literature. This two-step method was highly important as it led to a more comprehensive collection of models and publications (cf. Randolph 2009, p. 7). After

⁷ See Appendix B9.

⁸ For the literature collection and review, a coding book was developed that is available in Appendix A.

extracting the relevant models for this thesis, the founding literature of each model was collected. Next to the chosen platforms for the collection, the websites of each founding organisation (e.g. *ipma.world*, *pmi.org* or *maturityresearch.com*) were used. In terms of founding literature, the objective was to retrieve different versions aiming to get insights into the chronological developments of model definitions. Further, the goal for the collection of research studies is to gain insights in the form of applied maturity assessments. Again, from evolutionary (different years of study) and assessment country (company location) perspective. While the leading framework is the OPMMM, a few of them (e.g. the OPM3, IPMA-Delta) utilise additional frameworks by referencing or directly incorporating them within the OPMMM framework. These are two types of frameworks: Firstly, frameworks related to project management practices like the Project Management Body of Knowledge⁹ (PMBOK[®]) published by the PMI or the Project Excellence Baseline (PEB) published by the IPMA; and secondly, frameworks on competence development of project-related staff like the Project Manager Competency Development Framework (PMCDF) published by the PMI or the Individual Competence Baseline (ICB) published by the IPMA. When looking at the scope of this thesis, frameworks related to project management practices were excluded because their focus is related to processes. As competences in project management is a central topic in this thesis, the decision was to include competency development frameworks as they should give further insights into required individual competences.

With the purpose to capture relevant publications on recent research conducted, the name of each maturity model was combined with “Project Management Maturity Model” (i.e. “Project Management Maturity Model” AND “OPM3”, etc.). In order to probe for comprehensiveness, all searches have been repeated with all sources that are Google Scholar, Wiley Online Library and the search engine “OLAV” provided by the University of Applied Sciences in Vorarlberg. The author conducted the selection of appropriate literature by reading the articles in terms of the type of assessment (project management maturity) and the maturity model used. Only if the appropriate maturity model was applied, expected by the search parameters (e.g. OPM3, IPMA Delta), the article was taken into consideration.

The searches led to a variety of publications in several journals edited in different countries and industries. As predefined, the review starts in 2000 with the earliest publications identified and continues until April 2020. The sample comprises work that is already in the public domain, i.e. was published or appeared online first on a journal website but excludes forthcoming articles. Because searches have been conducted at the university’s library as well, books and book chapters are also included in the sample. Due to the objective of this master thesis, comprehensiveness means to consider work originated in different parts of the world. Due to limitations concerning access and language, it must be mentioned that important work had to be excluded. One example is the Shenzhen Project Management Maturity Model (cf. Yuan; Wang; Lixiong 2007) developed in China, which had to be excluded as it is only available in the Chinese language. This is the general case for papers published on *cnki.com.cn*. Furthermore, it must be taken into consideration that more models might exist but did not appear in the search results, because searches were conducted in English. Additionally, project management maturity models exist that could not be taken into consideration, because of restrictions regarding the access and because they

⁹ See Appendix B4.

have not been published, for example, a proprietary model developed and used by Mullaly (cf. Mullaly 2006, p. 65).

2.3 Overview of the Sample

The identified sample literature consists of three different types of literature and research, resulting in a total of fifty different pieces for the comparison.

2.3.1 Discarded Project Management Maturity Models

Due to the huge number of PMMMs available, certain models were systemically discarded based on one of the following criteria or a combination of them:

- The models are similar, as they are based on the same PM-standard (e.g. the PMBOK®)
- They originated from the same country, but another OPMMM was published more recently
- The models are similar, and they originated from the same country
- No documentation in English or German is available
- The model does not consider the organisation as a whole (is not considered an OPMMM)

More PMMMs may exist that were not included in the search results. The following table contains a list of PMMMs that were excluded from the scope of this thesis. Each model is listed with the year of creation and the reason for its exclusion.

Table 1 Excluded Project Management Maturity Models

Source: Own creation

PMMM Name and Publisher	Year of creation	Reason for exclusion
ProjectFRAMEWORK®, ProgramFRAMEWORK®, and PortfolioFRAMEWORK® (found in cf. Torres 2014, p. 45) developed by the consulting firm ESI International.	1999	This set of models builds on the PMI standard and was updated in 2006 and 2013 accordingly. However, updated versions of US-based PMMMs with an orientation towards the PMBOK® Guide have been published by Kerzner and the PMI.
Berkeley Project Management Maturity Model (PM) ² by Kwak and Ibbs (Ibbs; Kwak 2000)	2000	Updated versions of US-based PMMMs with an orientation towards the PMBOK® Guide have been published by Kerzner and the PMI.
Project Management Maturity Model "ProMMM" by Hillson and Project Management Professional Solutions Limited (Hillson 2001)	2001	ProMMM was developed in the USA as well. Updated versions of US-based PMMMs with an orientation towards the PMBOK® Guide have been published by Kerzner and the PMI.
Capability Maturity Model Integration (CMMI) developed by the Software Engineering institute	2002	The version 1.3 was published in 2010, the newest version 2 in 2018. Even though the CMMI Development Model that was developed based on

PMMM Name and Publisher	Year of creation	Reason for exclusion
(Software Engineering Institute 2010) which originated from CMM.		the CMM (see section 1.1.2) considers PM process areas (cf. Software Engineering Institute 2010, p. 43), it does not consider organisational PM as its focus.
Project Management Maturity Model (PMMM) by J. Kent Crawford and PM-Solutions (Crawford 2002)	2002	Updated versions of US-based PMMMs with orientation towards the PMBOK® Guide have been published by Kerzner and PMI.
Project Portfolio Management Maturity Model by Pennypacker (Pennypacker 2005)	2005	This model was created for the evaluation of project portfolio management only.
Zhenzhou Project Management Maturity by Yuan and Lixiong Model (Yuan; Wang; Lixiong 2007).	2007	PMMM definition and applied research documentation are only available in Chinese.
Construction Project Management Maturity Model by Fengyong and Renhui (Z. Fengyong; L. Renhui 2007)	2007	A newer construction based PMMM is available that was developed in China.
PRINCE2™ Maturity Model (P2MM) by Murray and OGC (Murray; Ward 2007, p. 2)	2007	This is the second PMMM published by the Office of Government Commerce (OGC), but compared to the P3M3, it was not further developed (see Table 2).
Program management organization maturity integrated model for MCPs (PMOMIM-MCPs) in China (Jia et al. 2011)	2011	Due to the availability of a newer PMMM created in China, this model was excluded.
Hybrid Project Management Maturity Model (HyProMM) and the Maturity Model for digital projects (M2DIP) created by Timinger and Seel (Seel; Timinger 2017; Timinger; Seel 2018)	2017 / 2018	Those two models have not been applied yet. Additionally, they are no OPMMMs.

2.3.2 Selected Organisational Project Maturity Models

The first collection of literature consists of the foundation literature (or framework) of each selected model. Some of the models also make use of different frameworks for the assessment. For example, they split the assessment into an organisational and an individual part that both require individual frameworks. Additionally, the search resulted in different versions of each framework that are required to evaluate their development. The following tables (Table 2 and Table 3) give a brief overview including:

- The index number (#) in the Coding Book¹⁰ (CB)
- The year of creation of the first edition of the model
- The name and the publisher of the PMMM as well as a brief description for its selection

¹⁰ See Appendix A.

- The target and the type of PMMM: Cleland and Ireland identify two different types of PMMM, *staged* and *continuous*. The former builds on individual steps, where each step establishes criteria for the next one. The latter establishes a baseline through an assessment, then specific criteria for improvement are defined (cf. Cleland; Ireland 2006, p. 249).
- The country of origin, which is the country of the publishing company or organisation

The systematic selection resulted in two different parts. The first part is visualised in Table 2 and consists of six main OPMMMs that have been developed on three different continents. The second part is outlined in section 2.3.3 and consists of two additional PMMMs originated from the two emerging markets Africa and China.

Table 2 Selected Organisational Project Management Maturity Models

Source: Own creation

# in CB	Year of creation	PMMM Name, Publisher and Reason for the Selection	Target	Country of Origin
			Type	
1 2	2001	Kerzner PMMM (KPMMM) by Harold Kerzner (Kerzner 2001, 2019). This model was chosen because it was applied in various industries and countries. Additionally, the latest edition was published in 2019, which is the latest publication of an OPMMM developed in the USA.	Organisational Staged	USA
3 4 5	2002	Prado-PM Maturity Model by Russel D. Archibald & Darci Prado (Prado; Archibald 2014) including two questionnaire versions (Prado 2006, 2014). This model was applied in various industries and countries and is the only model that originated from South America.	Organisational Staged	Brazil
6 7 8 9	2003	Organisational Project Management Maturity Model (OPM3) by the Project Management Institute or PMI (PMI 2003, 2013, p. 3) and the PMCDF (PMI 2007, 2017b). This model was selected because it was published by the PMI, which is one of the main institutions for project management and therefore, it is one of the industry standards (cf. Iqbal 2013, p. 472).	Organisational Continuous	USA
10 11	2004	The maturity model of the project-oriented company (POC) by Roland Gareis (Gareis 2004; Gareis; Huemann 2007; Gareis; Gareis-Halpin; Gareis 2018). This model was selected because it was applied across Europe and is the only model that originated from Austria.	Organisational Continuous	Austria
12 13 14	2006	Portfolio, programme and project management maturity model (P3M3) by the U.K. Office of Government Commerce or OGC (Sowden 2008; Murray; Sowden 2015) and the APM (Association of Project Management) body of knowledge (APM 2012). This model was selected	Organisational Staged / Continuous since the newest version	U.K.

		because it was further developed by AXELOS in 2015. Which is not the case with the PRINCE2 PMMM.		
15	2009	IPMA-Delta by the International Project Management Association or IPMA based on IPMA's Organisational Competence Baseline (OCB) and IPMA's Individual Competence Baseline (ICB) (Wagner 2014; Wagner et al. 2016; Caupin et al. 2006; Sedlmayer et al. 2015). This model was selected because it originated from the main project management institute in Europe. It was widely used, and frameworks used are being further developed.	Organisational	Europe / International (published in the Netherlands)
16			Continuous	
17				
18				

2.3.3 Selected Project Management Maturity Models from Emerging Markets

Even though the PMMMs in Table 3 do not focus on organisational project management, they were included because of their heritage and awareness of cultural aspects. Even though they are not included in the comparison, they should support the creation of the final comparison, synthesising of findings and conclusion.

Table 3 Selected Project Maturity Models originated from Emerging Markets

Source: Own creation

#CB	Year of creation	PMMM Name and Publisher	Target	Country of Origin
			Type	
19	2007	Evolutionary Software Project Management Maturity Model by Sukhoo, Banard & Van der Poll (Sukhoo et al. 2007)	Software-Projects	Mauritius
			Staged & Continuous	
20 21	2011 / 2020 (March)	Construction Consulting Service Project Management Maturity Model (CCS-PMMM) by Li et. al. (Li et al. 2020) based on the Conceptual Framework of Pasion (Pasion 2011)	Construction-Projects (based on eLearning PMMM)	China / Netherlands
			Continuous	

2.3.4 Selected Applied Research on Project Management Maturity

For further comparison, the following applied research studies have been collected. The selected journal articles have been published between 2003 and March 2020. Further, the number of citations for each article was retrieved from Google Scholar. The indicated numbers show some attention but also reflect that no huge efforts of comparison exist. Because further research on the CCS-PMMM by Li is only available in Chinese language (cnki.com.cn), only one reference for the comparison was retrieved.

The topic around project management maturity is linked to widespread use in various industries, as well as places of publication. This includes publications in international journals and conferences. The sample also indicates that organisational models have been applied in various countries and industries. At the same time, country- and industry-specific models (e.g. ESPM3, CCS-PM3) have been developed. With regards to transnationalisation outlined in section 1.1.3, the question is what this cultural adaption really is and why these general, organisational models can be applied internationally. Even though model creators indicate large numbers of applications, the number of published researches is rather sparse, and findings seem to only scratch at the surface which possibly leads to vague estimations. This was also indicated by Backlund et. al. (cf. Backlund; Chron er; Sundqvist 2014, p. 838).

Table 4 Applied Research on Selected OPMMMs

Source: Own creation

#CB	Reference	Model	Citations	Country of Origin
22	(Neves et al. 2013)	Prado-PM Maturity Model	2	Brazil
23	(Fraticelli; Archibald; Prado 2014)	Prado-PM Maturity Model	5	Brazil / Italy
24	(Laice de Souza Scotelano et al. 2017)	Prado-PM Maturity Model	3	Brazil
25	(F�ussinger 2006)	Gareis	15	Austria
26	(Gareis; Huemann 2007)	Gareis	53	Austria
27	(Supic 2005)	OPM3	25	Croatia
28	(Guangshe et al. 2008)	OPM3	44	USA / China
29	(Silva et al. 2014, 2019)	OPM3	18, n.A.	USA / Portugal
30				
31	(Katane; Dube 2017)	OPM3	6	South Africa
32	(Bay; Skitmore 2006)	KPMMM	34	Indonesia
33	(Ofori; Deffor 2013)	KPMMM	18	Ghana
34	(Polkovnikov; Ilina 2014)	KPMMM	11	Russia
35	(Berssaneti; Carvalho 2015)	KPMMM	190	Brazil
36	(Young Michael 2014)	P3M3	34	Australia
37	(Narbaev 2015)	P3M3	4	Kazakhstan
38	(Backlund Fredrik; Chron�er Diana; Sundqvist Erik 2015)	P3M3	27	Sweden
39	(Sukhoo 2009)	ESPM3	5	South Africa
40	(Bushuyev 2014)	IPMA-Delta	90	Ukraine

#CB	Reference	Model	Citations	Country of Origin
41	(Bushuyeva et al. 2018)	IPMA-Delta	1	Ukraine
42	(Vasili Osmakov et al. 2019)	IPMA-Delta	0	Russia

Finally, research on PMMM comparisons (Table 5) was selected. These papers were used to identify OPMMMs and their purpose. Further, these papers were also used for the literature identification and selection itself. And lastly, they also suit as a relevant input for the discussion in chapter 5.

Table 5 Existing Research on OPMMM Comparison

Source: Own creation

#	Citation	Models	Citations	Country of Origin
43	(Cooke-Davies 2004)	PMMM; OPM3	136	USA
44	(Khoshgoftar; Osman 2009)	KPMMM, OPM3, P3M3	133	Malaysia
45	(Iqbal 2013)	KPMMM, OPM3, PMMM	6	France
46	(Farrokh; Azhar 2013)	OPM3, P3M3, PMMM	25	Pakistan
47	(Torres 2014)	Gareis, OPM3, P3M3, KPMMM	20	Switzerland
48	(Archibald; Prado 2014)	IPMA-Delta, KPMMM, Prado, PMMM	5	Brazil, Mexico, USA
49	(Pasian Beverly 2014)	KPMMM, OPM3, P3M3	29	Netherlands
50	(Souza; Gomes 2015)	OPM3, KPMMM, PMMM, MMGP	39	Brazil

Recent studies and conceptual frameworks indicate that the topic is still relevant, and various adaptation of defined concepts is still going on. Recent examples are Görög who bases his paper on increased interest on project management maturity (cf. Görög 2016, p. 1658); or Torres who dedicated his doctoral thesis to PMMMs (cf. Torres 2014, p. 14).

With the purpose to avoid self-limitation of findings, no prior definition on dimensions that influence project management on organisational, individual, and team levels is conducted. Instead, the author directly starts with the current status on OPMMMs.

3. Current Status: Project Management Maturity Models

In this chapter, the literature around selected OPMMMs is reviewed in a systematic and structured way. The structure mirrors the choices of other recent reviews (see Table 4 in section 2.3). Therefore, the maturity models are rehashed as follows:

- Focus areas or assessed dimensions that are incorporated into the model
- Levels of maturity that the model defines
- The development of the model based on the comparison between two different versions including the latest release
- A summary of how the model was applied in terms of cultural dimensions based on results from applied research. The length of this section depends on the number of research papers found.

The initial definitions on dimensions and levels of maturity are outlined based on an earlier publication that was retrieved. Then the development is created by comparing this earlier publication with the latest retrieved publication. Depending on the accessibility of existing literature, these can be different editions of founding literature or questionnaires.

3.1 Research Setting

The overall sample reaches from 2000 to March 2020, which reflects the filter criteria (see 2.2) on recently published work that was applied during the data collection. The majority of the selected organisational maturity models originated from the USA. Two were created in Europe and one model in Brazil. Recent studies that applied these OPMMMs on an international level (cf. Table 4) prove their application on transnational level. None of the selected main models can be located to a specific geographical region. This was already pointed out in a study conducted by Souza (cf. Souza; Gomes 2015, p. 98). At the same time, country- and industry-specific models¹¹ (e.g. ESPM3, CCS-PMMM) have been developed. Regarding trans-nationalisation outlined in section 1.1.3, the question arises how these models are applied internationally.

3.2 Kerzner Project Management Maturity Model (KPMMM)

The KPMMM was developed by Dr. Harold Kerzner in 2001 at the International Institute for Learning (IIL) in the USA. Based on Kerzner's observation, excellence in PM derives from four critical components:

- Effective communication
- Effective cooperation
- Effective teamwork
- Trust

Hence, the KPMMM is significantly based on behavioural rather than technical (time, budget, etc.) dimensions, due to the reason that people manage projects and

¹¹ The ESPM3 and the CCS-PMMM are reviewed in the Appendices C1 and C2.

tools (cf. Kerzner 2019, p. Introduction). For the analysis, the earliest publication of the maturity model published in 2001 was taken. Afterwards, this version is being compared against the most recent version published in 2019.

To start with, Kerzner states that the first step in this process of strategic planning for project management is to understand the general environment. This includes the understanding of the demographic environment that also covers the geographic dispersion of the organisation. Questions arising are: “*How do we get everyone to support the methodology?*” and “*Will there exist language/communication complexities?*” (Kerzner 2001, p. 26). Secondly, strategic resources need to be identified. These include tangible resources like equipment, facilities, manpower, information/technology or human resources and intangible resources like the corporate culture, reputation, know-how and relationships with customers and suppliers. Information/technology includes software for project planning like time or budget. Kerzner also proposes software education aiming to encourage executives to use these tools (cf. Kerzner 2001, p. 32–37)

3.2.1 Assessment Dimensions

The KPMMM does not work with general dimensions for each level. Instead, every maturity level has its dimension for assessment. Therefore, the dimensions are combined with each level of maturity in the following section.

3.2.2 Levels of Maturity

The KPMMM is a staged maturity model with five-levels. The following figure shows the incremental approach on climbing towards more maturity. Important to mention is that levels can overlap due to actions defined in a later stage have been started before finishing all requirements of the level below. However, all requirements have to be fulfilled for the company to continue to the next level (cf. Kerzner 2001, p. 42–43).

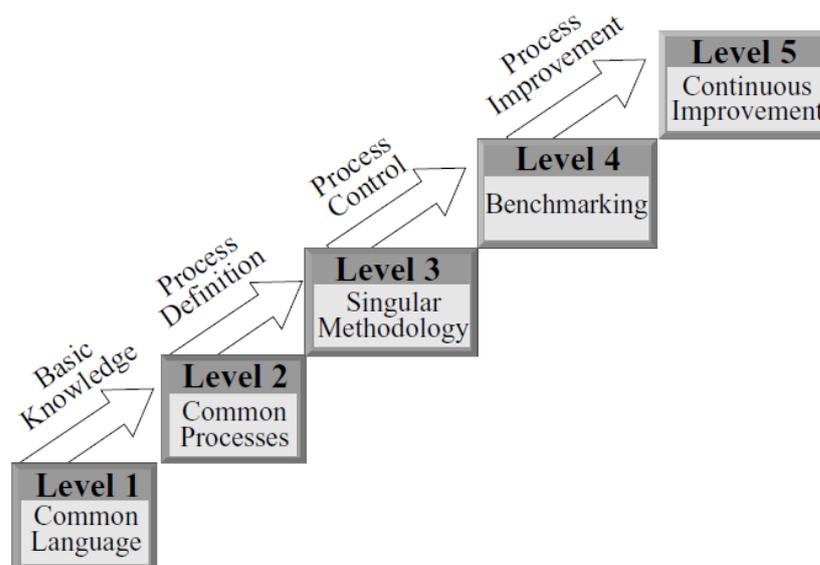


Figure 2 Maturity levels according to Kerzner

Source: Kerzner 2001, p. 42

3.2.2.1 Level 1 – Common Language

In the initial level, the company first recognises the importance of project management. The company owns either shallow knowledge about project management or nothing at all. Project management is not fully supported by the company and resistance to change exists. Neither, there is investment nor support for PM-training¹². The most important factor to overcome this level is education. The common PM language/terminology used needs to be defined (cf. Kerzner 2001, p. 47). The questions included in the assessment are roughly based on the knowledge areas of the PMBOK® Guide¹³. The result of the assessment (questionnaire) is a score in each knowledge area (Scope, Time, Cost, Human Resource, Procurement, Quality, Risk, and Communication Management). Being over a certain score proves reasonable basic project management knowledge (cf. Kerzner 2001, p. 50–51).

3.2.2.2 Level 2 – Common Processes

Level 2 is based on the principle that knowledge alone does not guarantee that project management practices are in use. Therefore, an organisation makes concerted effort to use and to develop common project management processes as well as methodologies to support its effective use. (cf. Kerzner 2001, p. 67). This level contains its life-cycle approach (Figure 3) in which the organisation recognises the need for project management (embryonic), followed by executive and line management acceptance to achieve growth and maturity.

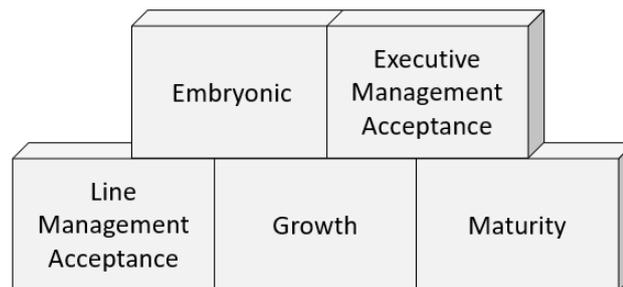


Figure 3 Life-Cycle phases for Level 2

Source: Based on Kerzner 2001, p. 69

With the purpose to accomplish this level of maturity, the following prerequisites need to be accomplished (cf. Kerzner 2001, p. 68–70):

- Visible line management support and commitment to project management
- Line management education
- Development of a company project management life cycle and methodology
- Minimisation of scope changes
- Selection of appropriate project management software to support the methodology
- Establishment of ongoing educational PM-curriculum (rather than individual courses) to support project management and enhance individual skills
- Training programmes for functional employees as well

In order to acquire this level, a company has to develop a company culture¹⁴ that supports the process and behavioural sides of project management (cf. Kerzner 2001, p. 72).

¹² See Appendix B7.

¹³ See Appendix B4.

¹⁴ See Appendix B1.

3.2.2.3 Level 3 - Singular Methodology

At this stage, the organisation recognises that exploiting synergies and process control work best using a single methodology approach rather than having multiple methodologies for a similar set of projects. Naturally, there could be different methodologies for example for product and software development, but the overall goal is to minimise them. In this stage, the company is fully committed to the concept of project management. The following six characteristics are covered in this level of maturity (cf. Kerzner 2001, p. 77–85):

- **Integrated processes:** Multiple processes streamlined into a single integrated process. Process integration into the organisational structure (strong line management support).
- **Cultural support:** Execution of the methodology through the corporate culture, which now fully supports the project management approach. The culture becomes a culture based on trust, communication, and cooperation. The questionnaire also considers training on morality and ethics within the company and when dealing with customers (cf. Kerzner 2001, p. 89).
- **Management support:** Visible project management support throughout all layers of management.
- **Informal project management:** Paperwork is reduced to a minimum. The organisation experiences that effective communication, cooperation, trust and teamwork contributes positively to work efficiency.
- **Training and education:** The company realises financial benefits from project management education. Those can be described qualitatively and quantitatively.
- **Behavioural excellence:** Additionally, the organisation recognises the behavioural differences between project and line management. Hence a completely different set of training programme is established.

3.2.2.4 Level 4: Benchmarking

At this level, an organisation can continuously compare (benchmark) itself with other companies worldwide with the goal to gain information on improvement possibilities. Characteristics comprised in level 4 are (cf. Kerzner 2001, p. 97–100):

- A central position in the company is established with a focus on project management knowledge (e.g. a PMO¹⁵). This central position is equipped with full-time employees taking care of project management. It also acts as a central database for lessons-learnt (knowledge management) and is responsible for sharing ideas and experiences on project management. This organisational unit further assists the HR department in creating project management career paths.
- Benchmarking is done against both, similar and non-similar industries.
- Quantitative (processes and methodologies) and qualitative (PM applications, cultures) benchmarking is practised.

3.2.2.5 Level 5: Continuous Improvement

Information gathered during benchmarking is evaluated and implemented to improve the project management process. Level 5 is characterised by the following criteria (cf. Kerzner 2001, p. 109):

¹⁵ See Appendix B10.

- Lessons-learnt documentation based on debriefing sessions is created.
- Knowledge from lessons-learnt is transferred to other projects and teams.
- Mentorship programmes are put in place to groom future project managers. It is administered by the PMO.
- A corporate-wide understanding is established that acknowledges that strategic planning for project management is an ongoing process.

In the end, the KPMMM reveals itself as a never-ending cycle in which level 3, 4 and 5 are repeated over and over again (cf. Kerzner 2001, p. 113). Additionally, Kerzner states that organisational restructuring to inherit project management is unnecessary if the corporate culture in terms of project management is strong (cf. Kerzner 2001, p. 136).

3.2.3 Development

To retrieve insights into the development of the model, the first version of the KPMMM published in 2001 was compared with the third and most recent edition published in 2019. The newest release adds additional problems when implementing a standard methodology for multinational enterprises. Those risks are varying applicable laws and regulations, different types of contracts, employment requirements and language barriers (cf. Kerzner 2019, p. 44).

The definitions in level 1 are very similar. Main changes occur within the questionnaire. In the most recent version, the project manager must use several different interpersonal influences that contribute to project success. A project manager must be able to select an appropriate form of power depending on a given situation (e.g. expert, reward, referent, legitimate). Also, the sender-receiver model in communication was included (cf. Kerzner 2019, p. 51). Project communications management now requires ensuring that the information needs of different stakeholders are met (stakeholder analysis, communication skills and technologies). There are no major changes in the definitions at level 2 (cf. Kerzner 2019, p. 53–55). Also, both frameworks use the same questionnaire that includes executive commitment, and understanding through training (cf. Kerzner 2001, p. 74–74, cf. 2019, p. 71–72). At maturity level 3, the third edition puts more emphasis on cultural transformation. Besides a multitude of cultural issues the following four are the most common: the embedded fear of change, fear of having to create a new social group, change in work habits or the comfort zone and uncertainty towards wage and salary programmes (cf. Kerzner 2019, p. 78). Both questionnaires at level 3 are identical and lay an eye on project management skills for the 21st century like technical knowledge, leadership, etc. (cf. Kerzner 2001, p. 89–93, cf. 2019, p. 85–92). The definition, as well as the questionnaire at level 4, are identical in both editions. The same is true for characteristics defined at level 5.

The third edition additionally describes how to conduct a maturity assessment. This includes identifying specific cultural issues that might cause resistance when doing the assessment, but without further specification. A second indicator that the model recognises transnational project management¹⁶ is that global organisations should evaluate if they can use the tool internationally. This requires to evaluate if customisation of the model is necessary (cf. Kerzner 2019, p. 175–176). Further, the KPMMM introduces the utilisation of best practices

¹⁶ Appendix B9.

as “...the idea that there is a technique, process, method, or activity that can be more effective at delivering an outcome than any other approach” (Kerzner 2019, p. 189). Kerzner is doing this by referencing to best practices published by the PMI. The transfer of best practices across the company is challenging the greater the company, especially with subsidiaries that are locally dispersed on several continents. Kerzner proposes different approaches like internal seminars, communities of practice, transferring people, or best practice libraries (cf. Kerzner 2019, p. 190–195).

3.2.4 Applied Research

Kerzner attached a sample report in the appendix of his book. As expected, organisational culture plays a major role at maturity level 3. The assessment evaluation suggests that the company needs to support the four basic values of project management: cooperation, teamwork, trust, and effective communication. Kerzner also states that this causes changes in the corporate culture which is a process that takes years. Additionally, behavioural training courses are proposed. However, without specification of transnational project management, like national culture or language (cf. Kerzner 2019, p. 235–262).

A study conducted by Bay and Skitmore in 2008 used the KPMMM level 2 assessment to evaluate maturity in Indonesian companies from various industries (construction, manufacturing, service providers, distributors, etc.). The questionnaire was solely based on the level 2 lifecycles (see Figure 3). The publication contains high-level results that indicate that PM-methodologies have not yet been used most efficiently in Indonesia. Efforts were starting up, with a focus on PM-practices (cf. Bay; Skitmore 2006, p. 2–6).

Ofori adopted the questionnaire that was used by Bay and Skitmore for a level 2 assessment in Ghana in 2013. The sample consisted of different companies in different sectors, like banks, consulting firms, manufacturing and construction, as well as public organisations. Ofori published high-level results showing low levels of maturity (Ofori; Deffor 2013, p. 58).

Berssaneti and Carvalho used a similar approach during a research study conducted in Brazil in 2014. Their sample consisted of different, typically project-oriented companies in different industries like engineering, construction, consulting and IT. Their survey was also based on maturity level 2. Results concentrated on organisational dimensions like top management support and technical performance in project management (cf. Berssaneti; Carvalho 2015, p. 7).

At the same time, Polkovnik and Ilina (2014) have assessed several companies in different sectors (IT, business and financial services, engineering and construction) in Russia. They used the KPMMM as orientation, however, their survey was primarily based on process tools and techniques (cf. Polkovnikov; Ilina 2014, p. 808–809).

3.3 Prado-PM Maturity Model

The Prado-PM Maturity Model was published in December 2002. It was created by Darci Prado in cooperation with IBM and two large Brazilian consulting companies (INDG and

FALCONI). The objective was to develop an easy-to-use model that leads to reliable results. It has been widely applied in hundreds of organisations across Brazil and was also applied in Italy, Spain, Portugal and the USA. The Prado-PMMM foundation states that it can be applied universally, without being bound to any industry or category of projects. The model is based on different guidelines. Firstly, a company must follow the best practices according to the PMI PMBOK® standard. Secondly, these best practices should be evaluated to eliminate causes that prevent good project outcomes (anomalies). Thirdly, innovation in terms of technology and processes is proposed. Then, the project management process undergoes a continuous improvement cycle. Each of those phases must be in place for a duration between 12 to 24 months. In this period, an action should be in routine use before stepping to the next higher level. This should lead to sustainability (cf. Prado; Archibald 2014, p. 1–6).

Today, the second version of the model is available, which was published in 2010. However, the book was not yet translated into English. Therefore, a publication on the foundations of Prado-PM Maturity Model was used for the analysis. Process areas that are being considered are strategic project management, project, program and portfolio¹⁷ (PP&P) management, and to transfer to the usage of the project results (cf. Prado; Archibald 2014, p. 6–7). Due to the unavailability of two different OPMMM versions, the development was conducted via a comparison of two different questionnaire versions.

3.3.1 Assessment Dimensions

Each level of maturity can contain up to seven dimensions at different intensities. Those dimensions form what Prado names the PM Platform. This platform consists of the following elements (cf. Prado; Archibald 2014, p. 10):

- **Competence in project and programme management:** The competence of key people in project management must have the knowledge and experience necessary to perform their respective role. Those aspects are contained in the PMI PMBOK® Guide or the IPMA ICB manual.
- **Competence in technical and contextual aspects:** Contains the competencies of key people involved in the technical aspects of the product being created, always depending on the function performed by the individual.
- **Behavioural competence:** Competences (knowledge and experience) of the individuals on behavioural aspects like leadership, organisation, motivation, negotiation, conflict management.
- **Methodology usage:** There should be a suitable project management methodology involving the entire project management cycle.
- **Computerisation:** Relevant characteristics of the methodology should be computerised. The system should be easy to use and support decision making.
- **Usage of convenient organisational structure:** A suitable organisational project management structure¹⁸ must be in place. This usually includes project managers, a PMO, sponsors, and committees. The structure shall inherit rules and regulations for

¹⁷ See Appendices B3, B5 and B6.

¹⁸ See Appendix B2.

organisational areas that deal with projects (e.g. regulations of authority and power between line and project management)

- **Strategic alignment:** The project initiated should be fully aligned with the organisation's strategies. This includes computerisation, an appropriate organisational structure and project portfolio management.

3.3.2 Levels of Maturity

Figure 4 gives an overview of the five levels of maturity defined in the Prado-PMMM. The following definitions are based on the Foundations of the Prado-PMM Maturity Model (cf Prado; Archibald 2014, p. 3–12).

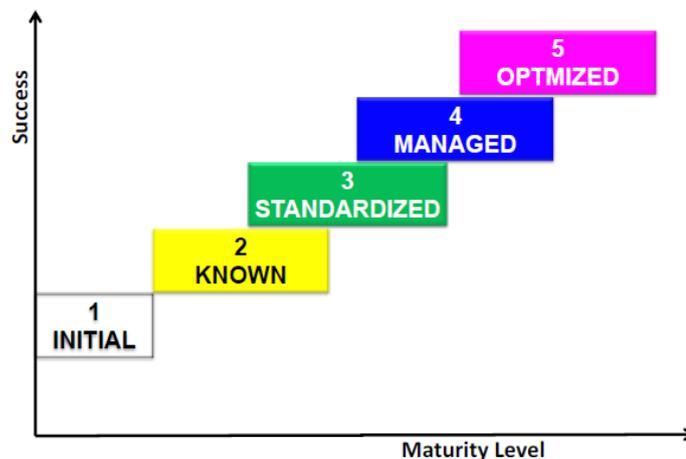


Figure 4 Prado-PMMM Maturity Levels

Source: Prado; Archibald 2014, p. 3

3.3.2.1 Level 1: Initial

In the initial level of maturity, there is no clear perception about projects and project management. Projects are being executed based on intuition, without planning and control.

3.3.2.2 Level 2: Known

There is an awareness for project management practices. Knowledge of project management is introduced. However, initiatives on project planning and controlling are isolated within the individual projects. Consequently, the department/organisation lacks standardisation in terms of processes, tools or organisational structure for example. Awareness to implement components like a PMO emerges.

3.3.2.3 Level 3: Standardised

Standardisation is implemented in form of the project management platform. As proposed in the sustainability guideline of the Prado-PMMM, this platform should be in use by the leading players for at least one year.

3.3.2.4 Level 4: Managed

In this level, a PMO is in place. Therefore, the elimination of anomalies that hinder project outcomes is situated. There is a high level of competencies of people working in project management. Analysis via data collected from projects is used to assess them and derive countermeasures if deviations from project goals exist. The organisational structure was reviewed and aligned towards project management and the organisational business. Project managers possess abilities to effectively managing human relationships, conflict solving, and negotiations.

3.3.2.5 Level 5: Optimised

Now, the PM-platform is underlying a continuous improvement cycle. Optimisation of processes and tools, project results (time, costs, scope, quality) takes place. This should also lead to efficiency increases in terms of working climate and low stress levels, as well as high standards in personal knowledge and attitude (leadership, discipline).

3.3.3 Development

Due to the unavailability of the first version of the model definition, two different versions of questionnaires are being compared. Since 2005 the model offers a maturity survey based on a questionnaire, diagnosis and the creation of an improvement plan. Therefore, version 1.4 published in 2006 and version 2.2 published in 2014 are being compared. Both questionnaires consist of ten questions per level (cf. Prado 2006, cf. 2014):

Questionnaire requirements for Level 2: Both versions require the acceptance of PM at top management and customer and project manager level. Also, acceptance on in- and external training according to global standards and implementation of PM-software is necessary. Regarding training content, only technical PM-competences are subject in version 1.4. In comparison, version 2.2 requires developing behavioural competences in PM. These are leadership, negotiation, communication, and conflict management. Version 2.2 additionally asks for alignment of projects and organisational strategy and organisational structure (PMO, committees, sponsor definition).

Questionnaire requirements for Level 3: Both questionnaires have the same scope in project management standards and established computerisation of PM. Also, both lay an eye on project planning documents, an established PMO and committees, and change management. Version 2.2 also considers a clear definition of project success and action plans regarding technical and behavioural competences on all involved hierarchy levels of the organisation (senior management, project management, PMO, etc.).

Questionnaire requirements for Level 4: Both questionnaires consider the elimination of deviations from project goals, the success of PP&P management, and the continuous improvement of the PM-methodology. Version 1.4 considers a training plan for human relationship abilities (leadership, negotiation, conflict management, motivation, etc.) at this stage. This also includes PM-certifications and the alignment of projects to the organisation. Version 2.2 additionally considers good governance that goes beyond the PM-methodology. This includes incentives for goal achievement and working on the competences of project managers regarding human-abilities.

Questionnaire requirements for Level 5: Both questionnaires require knowledge management based on closed projects, organisational structures in place, visibility and alignment of project management within the organisation, and a comprehensive computer-based system. Additionally, both entail that executives need to create an environment of low stress without further specification. Version 2.2 asks for team competence in project planning, tracking deadlines and costs, as well as technical product knowledge.

In general, questions are similar, but more detailed in the updated version. Additionally, aspects of competence development like behavioural aspects, and organisational alignment are considered earlier in the process. Further, the more recent questionnaire highlights the importance of leadership commitment.

3.3.4 Applied Research

Neves used the Prado-PMMM for the assessment of the maturity level at the R&D department of the Institution of the Brazilian Federal Government. It is stated that the model was chosen because of its practical way of obtaining the assessment results. Moreover, the model is aligned with the Brazilian national culture (cf. Neves et al. 2013, p. 460–463). Neves pointed out that poor communication, lack of knowledge, the inexperience of some project managers, the organisational structure, and resource allocation had significant impact on the results. Behavioural competence dimension scored low levels since there was no education on conflict management. The outcome was that upper management needs to promote a culture that values the use of a corporate tool for managing projects, acquiring of lectures and intensive PM-training. Also, the company needs to emphasise the development of its PMO as a central place for coordination and improvement (cf. Neves et al. 2013, p. 465).

A second assessment was conducted in Italy together with the Italian Institute of Project Management (ISIPM). Weaker areas identified were the strategic alignment of project managers with the business and that PM focuses primarily on procedures, methods and tools. There was a lack of behavioural skills and the proper management of people. Further, the assessment points out that the importance of IT system support is recognised (cf. Fraticelli; Archibald; Prado 2014, p. 4). Fraticelli highlights that the model can easily be applied (cf. Fraticelli; Archibald; Prado 2014, p. 17).

A third assessment in the Brazilian automotive industry took place in 2017 and was conducted by Scotelano et. al. The decision on applying the Prado-PMMM is also based on the ease of use and obtaining results, as well as on the fact that the model was developed in Brazil which leads to closeness to national culture. A first outcome was that the company needs to improve their knowledge management by implementing the collection of lessons learnt from projects. Secondly, the company had to focus on PM training efforts. Besides these points, the assessment emphasised to engage in communities of management practices to further develop capabilities (cf. Laíce de Souza Scotelano et al. 2017, p. 506).

3.4 Organisational Project Management Maturity Model (OPM3)

The OPM3 is a standard developed by the Project Management Institute (PMI) in the USA. The first version was published in 2003 and the latest in 2013 (cf. Torres 2014, p. 40). In this section, the first version is being outlined. The development is analysed by comparing the initial release (2003) with the third and most recent edition (2013). The OPM3 is an organisational PMMM and leverages different standards published by the PMI. Those include the PMBOK® Guide as standard for managing individual projects, and the PMCDF as standard for training and development of project managers. The latter is used for this thesis in addition to the OPM3 model.

The model itself is based on three basic components. The first component is the content of the standard that is referred to as **Knowledge**, for which the PMBOK® Guide is the foundation. This includes best practices (see next paragraph) and descriptions on how to use the OPM3. The **Assessment** is the second component, which is offered as self-assessment via a software tool. Selected best practices are being compared with the current maturity stage of the company. The assessment is based on a list of best practices. Due to the number of best practices available (537), a selection is conducted via brainstorming technique. Each best practice is made up of two or more capabilities which have one or more corresponding outcomes. A capability is a dedicated ability/competency that must exist in the organisation in order to improve PM. Hence, an outcome is a tangible or intangible result of applying a capability. Each outcome is translated into a Key Performance Indicator (KPI), which is a quantitatively or qualitatively measurable criterion. With this, an organisation can quantify the results and control if the capability exists (cf. PMI 2003, p. 15). Each of the best practices, capabilities are listed in the so-called Improvement Plan Directory (cf. PMI 2003, p. 32). Depending on the outcome of this first investigation, further in-depth investigations are offered. Finally, the third component is to provide guidance for **Further Improvement**. Once improvement measures have been implemented, an organisation then may return to the assessment step. The foundational concept of OPM3 defines it as global in scope, cutting across boundaries of organisational size and type. It states that it is applicable in cultures throughout the world, in virtually any industry (cf. PMI 2003, p. 3–9).

3.4.1 Assessment Dimensions

Best practices are organised in the following top-down manner. On top, high-level project-portfolio processes exist. Subsequently, the project programme-processes and individual project processes are located (cf. PMI 2003, p. 21).

- **Project management processes**¹⁹: This dimension utilises the project management process groups according to the PMBOK® Guide. In here, maturity is the ability to perform each process well. This implies that relevant best practices are implemented (cf. PMI 2003, p. 22–23).

¹⁹ See Appendix B3.

- **Project programme processes**²⁰: In OPM3, a project programme consists of a group of related projects. Key activities include the management of stakeholders' expectations on programme level, to ensure that the programme objectives support the portfolio's, prioritisation of individual projects in the programme and allocation of resources (cf. PMI 2003, p. 25).
- **Project portfolio processes**²¹: This dimension includes translating of organisational strategies into initiatives or business cases, identifying and initiating projects or programmes, resource re-allocation and stopping or closing of initiated projects (cf. PMI 2003, p. 26).

Furthermore, the following Best Practices contained in the Best Practice Directory of the OPM3 need to be pointed out (cf. PMI 2003, p. 112–122):

- Lessons-learnt is embedded in the PM-approach, and knowledge management is used to incorporate them into the PM-methodology.
- Decision-makers recognise OPM3 as part of the organisational improvement essential for the future of the enterprise.
- Tools for project management are integrated into other corporate systems to provide a project view of the organisation.
- The use of a common language to describe project activities and deliverables.
- Continuous training and development programmes for PM is established. This is included in the career development path for all PM roles.
- It is also required, that the organisation fosters a work environment of teamwork and trust (cf. PMI 2003, p. 101).

On top, the OPM3 references to the Project Manager Competency Development²² Framework (PMCDF). The PMCDF was first released in 2002. It has the purpose to give guidance to organisation's and individual's on how to assess, plan, and manage competencies in project management. The initial version of the OPM3 (2003) only states that it is a standard that exists besides the PMCDF. Since the newest release of the OPM3 (2013), the model overview commits to apply the PMCDF standard. For the comparison and the analysis of the development, also the second edition of the PMCDF published in 2007 is outlined. Later, this version is being compared against the version published in 2017. The PMCDF includes project manager performance, knowledge, and personal competence. Knowledge competence can be reached by passing an examination that is based on performance and personal competencies (cf. PMI 2007, p. 1–2). The most important performance and personal competencies are summarised as follows:

- **Performance competences** relate to the ability to perform the project processes of initiating, planning, executing, and closing. This includes the project management process groups according to the PMBOK® Guide (cf. PMI 2007, p. 5-10).
 - o Important dimensions in terms of human resource management are the acquisition of team members, team development (mentoring, team-building activities), as well as change-, (project scope changes), and communication-management (communication plan, and strategy).

²⁰ See Appendix B5.

²¹ See Appendix B6.

²² See Appendix B7.

- To manage change means to identify changes and their impact and to communicate them to stakeholders appropriately. Planning a project includes a selection of appropriate communication tools (cf. PMI 2007, p. 12–20).
- **Personal competences** consist of “...*behaviours, attitudes, and core personality characteristics that contribute to a person’s ability to manage projects*” (PMI 2007, p. 23). They are grouped into methods for communicating, leading, managing, cognitive abilities, effectiveness in using tools and techniques, and professionalism (cf. PMI 2007, p. 26–38):
 - Communication means to actively listen and to use the right approach of communication adapted to the audience.
 - Leading means to create an effective team environment (recognising abilities of team members, support decision making) adapted to the local culture.
 - A project manager is maintaining relationships appropriate to the team by building trust. This includes acting with integrity and keeping commitments by acting with sensitivity and genuine interest in the feelings and values of others. This also contains influencing skills that require to utilise strong negotiation skills and positional power as well as knowledge from third parties in order to persuade others.
 - Managing the team means to build and effectively maintaining teamwork. This includes effective conflict-management by genuinely valuing and respecting the input and expertise of others. Which also requires the willingness to learn from other opinions.
 - The cognitive ability covers the ability to understand and explain attitudes of individuals and to anticipate their future behaviour. Further, effectively resolving issues and problems by applying lessons-learnt is included.
 - Effectiveness requires to have the competence for using knowledge management tools to log and resolve project issues. Finally, professionalism contains the ability to maintain self-control in all situations by utilising techniques like stress management (cf. PMI 2007, p. 34). The goal is to manage own emotions and to respond calmly.
 - Professionalism also requires managing a diverse workforce that includes the development of trust to ensure adherence to cultural issues and ethical values, as well as respecting personal, ethnic, and cultural differences. This also means to adhere to the PMI’s definition of “Code of Ethics & Professional Conduct”. In here, ethics is about “... *making the best possible decision concerning people, resources and the environment. Ethical choices should diminish risk, advance positive results, increase trust to determine long term success and build reputation*” (PMI 2020). The code incorporates four basic ethical values of honesty, responsibility, respect and fairness.

3.4.2 Levels of Maturity

The Best Practice Directory gives orientation about the OPMM. Best practices and capabilities are mapped to the two factors domain and stage. The term domain refers to the process groups (PP&P management) and stage addresses the process improvement stages of (1) Standardise, (2) Measure, (3) Control, and finally (4) Continuously improve (cf.

PMI 2003, p. 19). But, instead of discrete levels of maturity, OPM3 shows the organisational maturity in a matrix with different scales visualised in the OPM3 Process Construct (Figure 5). The OPM3 Process Construct shows the combination of the five levels of improvement with the three process dimensions. Each dimension is further combined with the five PMI project management groups (initiating, planning, executing, controlling, closing) at every level. Therefore, OPM3 is multi-dimensional and continuous per definition (cf. PMI 2003, p. 28).

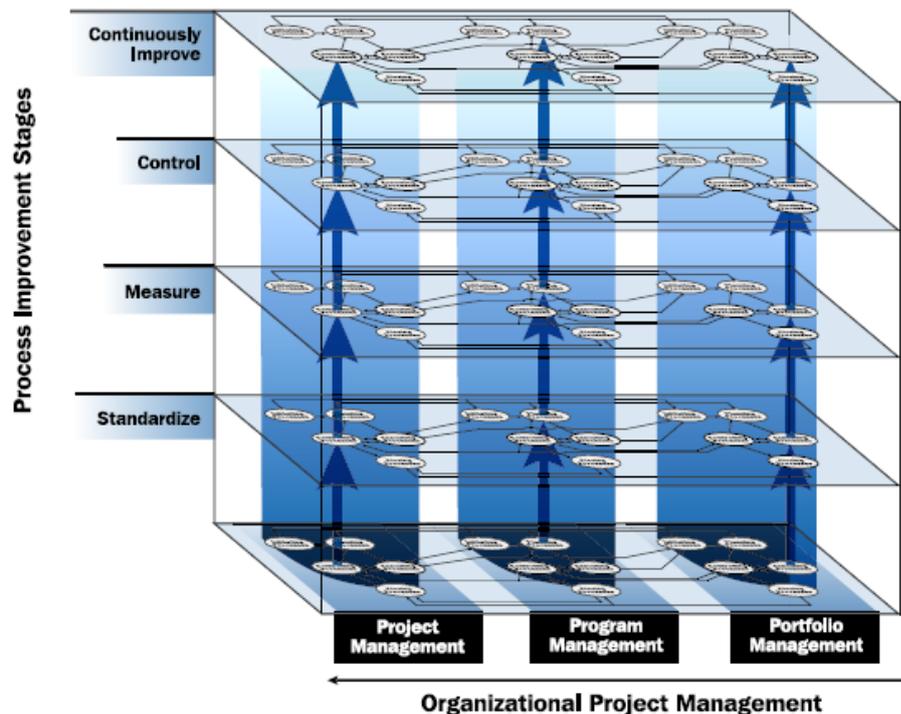


Figure 5 OPM3 Process Construct

Source: PMI 2003, p. 28

3.4.3 Development

The most recent version of the OPM3 introduces the new dimension Organisational Enablers (OE) to the model. The purpose of the OEs is to support the execution of the framework. The followings list describes the main OEs (cf. PMI 2013, p. 33):

- **Structural:** An appropriate organisational structure supports relationship building among employees, allocation of resources, and alignment to the strategy.
- **Cultural:** The organisational culture needs to embrace PP&P management. Then, project managers or executives can build on this culture and establish governance, policy, and vision.
- **Technological:** Management systems support project management tasks and encourages the reuse of best practices, techniques, and further enables knowledge sharing.
- **Human Resource:** Success depends on the right people in the right place. HR enables this, such as competency management, individual performance appraisals, and training investments.

Besides PP&P management, the most recent version also highlights the need for strategic planning. It highlights the role of the PMO as a central place for coordination, coaching and training, as well as implementation of project management processes and policies. Additionally, it emphasises on the importance of the development opportunities of human capabilities (e.g. leadership, problem-solving, decision making, communication) and the value of the organisational culture. Also, a supportive information system and team structure are considered. It is stated that an organisation has to demonstrate visible, unreserved commitment towards project management practices to be successful (cf. PMI 2013, p. 22–23).

The model proposes different decision-making techniques for selecting appropriate best practices for the assessment. This includes pros and cons, scoring, facilitated workshops and group decision-making techniques (cf. PMI 2017b, p. 108). When comparing Best Practice Directories, the following additions must be mentioned. They show a further integration of the PMCDF into the OPM3:

- Education of executives on the benefits of project management (cf. PMI 2013, p. 169)
- Leadership programme for stakeholders²³ of OPM (cf. PMI 2013, p. 173)
- The OPM3 requires cultural diversity awareness education to empower staff to work in a multi-cultural environment (cf. PMI 2013, p. 173)
- The OPM3 requires the demonstration of competences from the PMCDF (cf. PMI 2013, p. 175)

The author also compared the third edition of the PMCDF published in 2017 with the second edition outlined above. In contrast, the third edition also considers competencies for programme-, and portfolio-managers (PMI 2017b, p. 108–158). When comparing competences, the dimension of professionalism contains two additions. Firstly, the ability of self-control was complemented with the ability of self-reflection. The individual must reflect on the appropriateness and effectiveness of actions (through surveys or observations) to understand the causes of mistakes and failures. Secondly, professionalism requires the dissemination of the organisational culture of respect and ethics into the project culture (cf. PMI 2017b, p. 105–106). Finally, the model acknowledges that the approach of competency development may differ significantly from one country and culture to another. Hence, it is necessary to understand cultural differences before deploying the competency framework (cf. PMI 2017b, p. 55).

3.4.4 Applied Research

In 2005, Supic analysed the organisational maturity of selected organisations in Croatia. The assessment considers the PM processes described above. Main criteria were the process groups of the PMBOK® Guide. The main outcome of the assessment was that training on PM practices is recognised as the most important mean of maturity improvement (cf. Supic 2005, p. 651–652).

An assessment conducted by Guangshe in 2008 shows similar results. This assessment was conducted at the Shanghai Airport Authority during the construction of Terminal 1 and

²³ See Appendix B8.

2 at Pudong Airport. This is a typically large state-owned company established by the Municipal Government of Shanghai to accomplish mega-sized projects. The chosen methodology was a mixture of questionnaires and face-to-face interviews with the senior management. Each department of the organisation was assessed individually. The assessment focused solely on the process dimensions of OPM3. Part of the conclusion was that the OPM3 model could not be applied in China due to cultural and political issues. These were factors like responsibility or supervision mechanisms (leaders are absolute authorities). Also, they claim that a lack of knowledge on the PMBOK® caused major problems in understanding the model and its benefits on the side of Chinese project members. Therefore, Guangshe recommends implementing a guidance system and culture for OPM3 in the organisation. This also means to improve the understanding of the model towards senior project managers (cf. Guangshe et al. 2008, p. 57–61).

In 2014 and 2019 Silva et. al. conducted maturity assessments in Portugal. In their first publication in 2014, PP&P processes, as well as organisational enablers were assessed. The assessment of 19 organisations on organisational enablers resulted in organisational project management communities receiving the lowest score (cf. Silva et al. 2014, p. 1035). During the second assessment in 2019, structural, cultural, technological, and human resource practices were considered. In this study, it is stated that the OE practices “... can be leveraged to support and sustain the implementation of good project management practices and might be therefore the answer to increase maturity” (Silva et al. 2019, p. 6). Interestingly, the assessment result showed that none of the organisations assessed utilise OEs such as PM training. Hence, the overall poor result was traced back to the absence of OEs (cf. Silva et al. 2019, p. 8).

The latest maturity assessment with the OPM3 contained in the literature research was conducted by Katane in 2017. The assessment focused on virtual project teams. Here, the positive influence of the organisational culture was highlighted that needs to be team-, communication- and outcome-oriented. Further, their research results identified additional factors, such as leadership, trust, communication and ICT tools to be highly influential when looking at the project success. Here, project success was defined as reaching time, budget, scope and customer satisfaction (cf. Katane; Dube 2017, p. 5–6).

3.5 Maturity Model of the Project-Oriented Company (Gareis)

The model was created by Roland Gareis and the PROJEKTMANAGEMENT Group of the Vienna University of Economics and Business Administration in 2004 (cf. Gareis; Huemann 2007, p. 190). The underlying reason for the development of this PMMM was that companies are becoming more project-oriented. Due to the strategic importance of using projects to achieve corporate goals, the maturity model relates to the so-called Project-Oriented Company (POC).

The POC maturity model is based on a questionnaire. The score per dimension is visualised in the “POC spiderweb”. Figure 6 illustrates the spider web diagram including all business processes considered by this maturity model. The spider web is used for the development of the defined competencies and supports benchmarking with other companies (cf. Gareis 2007, p. 142). According to Gareis, the new POC management paradigm is characterised by (individual, team, and organisational) learning, process and customer orientation, teamwork, networking and cooperation, as well as continuous improvement. The foundation used for the definition of the model describes an organisation via its strategies, structures, and cultures. Those three components must be aligned towards each other to create good quality services within cost, time and budget. Hence, it is already pre-defined that projects can only be successful if the appropriate strategic and cultural provisions are established. The POC is characterised by having an explicit PM culture in place that inherits PM-related values and norms (cf. Gareis 2004, p. 123–128).

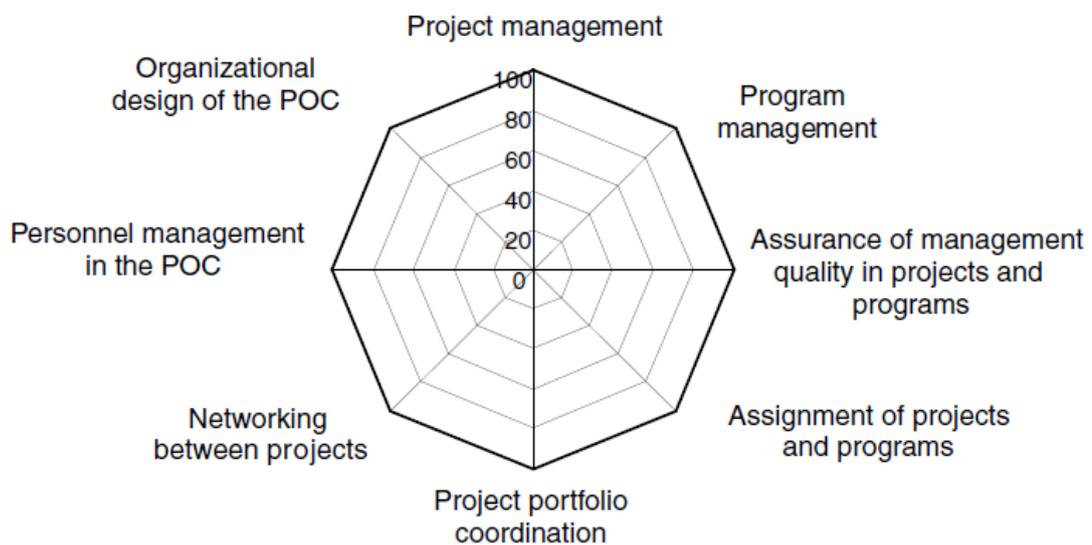


Figure 6 Maturity Model of the POC based on Roland GAREIS

Source: Gareis 2007, p. 128

3.5.1 Assessment Dimensions

The following list describes each dimension provided in the Gareis POC Maturity Model (cf. Gareis 2004, p. 129–140):

- **Project management**²⁴ is considered a business process. It includes sub-processes like project start, continuous project coordination, project controlling, resolution of a project discontinuity, and the project closedown.
- **Project programme management**²⁵ allows organisational learning, economies of scale, and utilises networking synergies.
- **Project portfolio management**²⁶ includes the definition of priorities, the coordination of internal and external resources, and the organisation of learning between projects.

²⁴ See Appendix B3.

²⁵ See Appendix B5.

²⁶ See Appendix B6.

This includes an expert pool in PM, which are responsible for personnel, knowledge, and infrastructure management. An expert pool can be several experts in a chosen field (e.g. engineering, marketing etc.). Each expert inherits the role of coordinating PM activities in the respective business area. They are responsible for recruiting and developing of PM personnel, as well as to provide the necessary infrastructure (cf. Gareis 2004, p. 41).

- **Assurance of management quality in projects and programmes:** Assurance of management quality in projects is done via management consulting and management auditing. Those activities are performed with the scope of further developing PM competence.
- **Assignment of projects and programmes:** In most cases, investments (infrastructure, new products or services, new markets, etc.) are the foundation for initiating projects or programmes. Therefore, a decision board needs to be in place to initiate and prioritise new projects or programmes.
- **Networking between projects:** A network of projects is consisting of closely coupled individual projects. Closely coupled can refer to a common client, a common partner, a geographical region or a common technology. The construction of a network inherits the objective to identify synergies and potential for conflicts. Further, it enables relationship building through ad hoc communication.
- **Organisational Design²⁷ of the POC:** To operate successfully, certain organisational structures are required. Those include a PMO, a project portfolio group and expert pools with PM-personnel, trainers and consultants. The PMO is further responsible for providing supportive PM-services, establishing a PM-career path and to provide a suitable PM-infrastructure (e.g. ICT tools, meeting rooms, etc.).
- **Personnel Management²⁸ in the POC:** Processes within the area of personnel management in the POC encompass recruiting, leading, developing, and releasing of project staff. There are certain definitions of each PM role within the POC. Each of these roles has its own dedicated PM career path. They are required by individuals and by teams. Gareis splits required competences into PM process competencies and functions to creatively design the PM process. For example, a project manager must possess capabilities such as the selection of PM methods appropriate for a given project and appropriate communication structures. These include the facilitation of the different workshops and meetings, the selection of the appropriate IT infrastructure and the appropriate form of documentation. Additionally, cultural awareness and language knowledge are prerequisites for international projects. This cultural competence contains knowledge and experience of different national cultures of project members or stakeholders. Competences of project teams include individual competencies of each team member to perform their given tasks as well as social knowledge and experience. The project team needs the ability to solve conflicts, to produce synergies and to ensure learning in the team.

²⁷ See Appendix B2.

²⁸ See Appendix B7.

3.5.2 Levels of Maturity

The POC maturity model based on Roland Gareis does not offer different levels of maturity. Instead, each dimension receives a certain score (0 – 100) based on a questionnaire (cf. Gareis 2004, p. 141).

3.5.3 Development

In the most recent publication (2018), major changes were conducted on the model itself. Project- and programme management were segregated into initiating and managing. A completely new dimension of initiating and managing change was added with the objective to successfully implement changes caused by projects in the context of organisational development. Benefits can be derived by transparency on plans of change, fulfilled expectations through appropriate stakeholder communication and involvement. This is further supported by individual learning through reflections (cf. Gareis; Gareis-Halpin; Gareis 2018, p. 393). Further, networking between projects now requires a cooperative culture that fosters horizontal communication and mutual trust as central values (cf. Gareis; Gareis-Halpin; Gareis 2018, p. 465). Additionally, individual and team competencies are outlined on much broader detail (cf. Gareis; Gareis-Halpin; Gareis 2018, p. 163–178):

- The **Leadership** dimension covers the selection of an appropriate leadership style depending on a given situation. It means to intervene with targeted influence on the behaviour of persons or teams. Within this dimension, value-oriented leadership is proposed, which requires to disseminate the organisational value system (culture) into the project culture. Another core-competency of value-oriented leadership is the ability to reflect and adapt behaviour and action or values. Also, emotions (anger, fear, joy, sadness, etc.) in the project should be observed and controlled as required. Measures could be team building for integrating team members with different cultural backgrounds, the collective development of plans or directly addressing taboos to avoid fear.
- **Social competences** are communicative and cooperative abilities that serve the realisation of objectives in social interactions:
 - o For a project manager to manage different situations by utilising different communication methods and techniques. Those are managing other's emotions (see above), networking, communicating virtually, negotiating, conflict management and teamwork.
 - o To learn as a team, creativity is required to exploit synergies and to resolve conflicts. Teamwork requires the selection of appropriate team members and team building as a basis for efficient cooperation. Additionally, dealing with conflicts also requires accepting differences and different opinions.
- **Self-competences** are required to fulfil one's own tasks and applying stress management, time management, and self-motivation:
 - o Self-understanding a project manager refers to professionalism and requires dealing and understand oneself. It is required to understand personal emotions and values (ethics) as well as to act with self-control when dealing with others and to be open and able to cooperate. The model also adopts the "Code of

Ethics” from the PMI that emphasises on the values of responsibility, respect, fairness, and honesty.

- Further, Inter-cultural awareness and competence in a foreign language are prerequisites for international projects (also mentioned in prior version).

Gareis highlights the development of a project-specific culture to encourage team members to identify themselves with the project. Hence, members of a project organisation that come from different cultural backgrounds can develop their own project culture for their temporary collaboration. The creation of own values and rules requires time and reflection in the project. Also, project-specific language shaped by communication and the use of project-specific terms are included in the project culture (cf. Gareis; Gareis-Halpin; Gareis 2018, p. 155).

3.5.4 Applied Research

Füssinger researched on project management maturity in 350 project-oriented companies in about fifteen countries. One of the studies called “*project orientation [austria]*” was finished in July 2005 and its results were published (cf. Füssinger 2006, p. 1–5). Also, Gareis and Huemann refer to the results of this study in which 60 different Austrian companies were assessed. When it comes to the assessment on personnel management, the following dimensions were assessed (cf. Gareis; Huemann 2007, p. 207):

- Professional recruiting of project and programme managers
- Leading of project and programme management personnel
- Project-related incentive systems
- Development of project and programme management personnel
- Project management competencies of the project and program management personnel
- Project management competencies of managers

One of the results of the assessments was that a high score in organisational design and personnel management was necessary to reach a high level of maturity (cf. Füssinger 2006, p. 4).

3.6 Project, Programme and Project Management Maturity Model (P3M3)

The P3M3 was published in 2006 by the Office of Government Commerce (OGC) in the United Kingdom. This investigation is based on the second version of the P3M3 published in 2008 (cf. Sowden 2008). The second version is compared to the third and latest version published by AXELOS Ltd. in 2015. Since 2008, the P3M3 was applied outside of the U.K. including the Middle East, China, Australia, Africa, and Europe (cf. Murray; Sowden 2015, p. 1-9).

3.6.1 Assessment Dimensions

The P3M3 requires a long term strategic commitment to improve organisational PM (cf. Sowden 2008, p. 18). It is an overarching model consisting of the following three connected sub-models:

- **Portfolio Management Maturity Model (PfM3)**
- **Programme Management Maturity Model (PgM3)**
- **Project Management Maturity Model (PjM3)**

As there are no interdependencies between those models, they can be applied independently as well. The following seven perspectives (=dimensions) can be assessed for each individual model at all levels of maturity (cf. Sowden 2008, p. 22–23):

- **Management Control:** This is internal control over the lifecycle of an initiative (= PP&P). It characterised by clearly defined decision-making processes and complete objectives. Initiatives do have defined outputs; a portfolio is related to an organisational target. Additionally, internal structures are aligned to achieve these characteristics.
- **Benefits Management:** Business change outcomes are clearly defined, measurable and delivered through a structured approach. Benefits need to be assessed and approved. They impose an owner and realisation plans in order to be actively managed to ensure that they are achieved.
- **Financial Management:** The organisation's financial functions are involved, with approvals being embedded in the broader organisational hierarchy. Costs are managed over the investment lifecycle and financial management ensures the availability of funds to support investment decisions.
- **Stakeholder Management:** Stakeholders inside and outside the organisation are analysed and engaged with. Stakeholder Management includes communication management (planning, selection of the right channel).
- **Risk Management:** Ensures a balance between risks and opportunities. This includes identifying them and taking actions to eliminate or reduce the occurrence probability and/or consequences.
- **Organisational Governance:** Ensures the alignment of initiatives towards the strategic direction. This includes the coordination for starting, progress and closing of initiatives. In contrast to Management Control, the focus is on controlling external factors that impact initiatives (e.g. legislative and regulatory frameworks).

- **Resource Management:** Management of all types of resources, including human resources, buildings, equipment, supplies, information, tools and supporting teams. It also means that capacity planning ensures the most effective use of resources.

Each process perspective (=dimension) contains a set of attributes. Such attributes are available on every level of maturity indicating the exact position. This could be training provision, individuals experience, resource acquisition procedure, etc. Hence, the outcome of an assessment indicates the level of maturity per perspective (see Figure 7 including colouring). Detailed descriptions of all attributes are provided inside the model (cf. Sowden 2008).



Figure 7 An example of a result of a P3M3 assessment

Source: Murray; Sowden 2015, p. 15

3.6.2 Levels of Maturity

There are five different levels of maturity used by the P3M3. The description and characteristics of each level apply for each of the three sub-models equally. Those five levels apply for PP&P management as well as for each of the seven dimensions individually (cf. Sowden 2008, p. 18–20):

3.6.2.1 Level 1: Awareness of Process

No process documentation exists and there are no or only few process descriptions available. Processes might be acknowledged in general, but actual practice is depending on individual preference. Hence, processes are underdeveloped or incomplete. There is little or no guidance on improvement. There is no standardised PM terminology across the organisation.

3.6.2.2 Level 2: Repeatable Process

Basic management practices have been established (e.g. scheduling of resources) and processes are developing. No rigorous process discipline exists across the organisation,

but where it exists, initiatives (=PP&P) are performed and managed upon documented plans (e.g. project status, milestone plans). Top management starts to take the lead on several initiatives but probably with inconsistency. There might be inadequate measures of success, unclear responsibilities for achievement, limited experience in change management or missing communication strategies.

3.6.2.3 Level 3: Defined Process

Both management and technical processes related to achieve the organisational purpose will be documented, standardised and integrated with other business processes. In this level, definitions towards different roles like process owners and process groups are created. Those instances focus on standardised processes and improvements across the organisation. Top management is pro-actively engaged and provides active support. Likely, a dedicated training programme is established to develop knowledge and skills of individual employees. Additionally, quality management is in place and identifies process improvement possibilities by utilising peer reviews.

3.6.2.4 Level 4: Managed Process

This level is characterised by mature processes that are quantitatively managed. This includes quantifiable objectives for quality and process performance. The measurement data collected contributes to the organisation's overall performance. Management can effectively control processes and adjust them if necessary. Mentoring and extensive training, focusing on personal development and performance improvement are provided (cf. OGC 2008, p. 98).

3.6.2.5 Level 5: Optimised Process

Optimisations are implemented based on their quantitatively managed processes. This enables the organisation to proactively change based on changing business needs and external factors. Additionally, future capacity demands can be anticipated. The organisation learns from past reviews (lessons-learned shared openly) and continuous process improvement is being enabled. Strong alignment to organisational objectives is created. PM-skills are embedded in organisational leadership and management development programmes (cf. Sowden 2008, p. 69).

3.6.3 Development

The P3M3 was further developed by the two companies Aspire Europe and Outperform UK Ltd. (cf. Murray; Sowden 2015, p. 15). A major improvement is the necessity of a supportive organisational culture that is embedded into project management (cf. Murray; Sowden 2015, p. 19, 68). Another development introduced is that lower level capabilities of dimensions are no longer a prerequisite for assessing dimensions at a higher level. This makes the assessment easier and leads to a complete picture. Additionally, the P3M3 was aligned towards other industry standards in project management. PM-skills, knowledge training and development programmes are included at level 3 now (cf. Murray; Sowden 2015, p. 47). The framework became customisable: Depending on the industry, different dimensions might be rated more relevant (cf. Murray; Sowden 2015, p. 43). The

organisational governance dimension now includes the characteristics of leadership behaviour, legal compliance and communities of practice to enable cross-organisational development (cf. Murray; Sowden 2015, p. 49). Another significant update is the inclusion of the Association of Project Management Body of Knowledge or APMBOK (cf. Murray; Sowden 2015, p. 10). It is a complete set of project management concepts, terms and activities divided into the following three components:

- **Context** includes the dimensions governance and setting.
 - o The project governance is part of the corporate governance. It includes PM life-cycle management, committees for decision-making, the acceptance of responsibility by the organisation's top management and clearly defined roles and responsibilities. The goal is to foster a culture of improvement and knowledge management.
 - o Setting ensures the alignment between project management and the organisation (cf. APM 2012, p. 8–40).
- **People** includes dimension and skills to motivate and coordinate people to achieve specified objectives (cf. APM 2012, p. 49). The People dimension is split into Interpersonal skills and Professionalism. Interpersonal skills include (cf. APM 2012, p. 52–76):
 - o Communication that needs to be tailored to the audience in regards of cultural backgrounds or the team location and working environment. Barriers of communication can be caused due to cultural differences, lack of a common language or understanding across disciplines. Due to the range of available media (social media, email), their selection should be done carefully.
 - o Conflict management requires sensitivity and empathy, as well as objectivity and ethical stance. Actions may be recognising levels of authority and power, reflecting perspectives and expectations, or to focus on the issue. Delegation skills are necessary to hand over authority to act on behalf of another. This includes matching the work to behaviour and competences of the delegated resource.
 - o Influencing evolves through relationship building. Those relationships are built on shared values, ethical positions, trust and respect. To influence successfully means to affect and change attitudes of others. On the one hand, individuals must be able to assess and understand their own patterns of attitude, behaviour, emotion and decision-making and on the other hand, they also need to understand the feelings of others. These patterns are complex constructs based on own experiences, culture, or emotional states. Influencing also requires cultural awareness, negotiation, and communication skills.
 - o Leadership is the ability to create vision and direction that enable others to strive towards a common purpose and achieve success. This includes the understanding of different leadership styles aiming to apply the appropriate style during the PM lifecycle. They must be aware of motivational factors of their team members and act as mediator, or coach. Further, the authority required should be maintained with expert-knowledge or different forms of influencing like gaining trust, confidence or inspiration.

- Negotiation skills are required to reach an agreement. This includes the ability to set goals and limits, emotional control, as well as listening and verbal communication skills.
- The teamwork dimension includes team selection that needs to consider individuals personalities that function well together. When developing a team, skills and personality factors must be recognised. Within teamwork, different cultural backgrounds, or working environments must be considered. Additionally, a project manager must consider that the team might be physically distributed across different time zones.
- Professionalism (second part of the dimension **People**) is the ability of continuous learning to maintain the appropriate skills and follow an appropriate code of ethical conduct. Professional behaviour further promotes trust (cf. APM 2012, p. 80–88):
 - Establishing communities of practice to develop competences. Communities of practice are groups of people who develop expertise through regular interaction. These can be experiences, stories, tools, etc. Members of a team should act ethically. Relationships are built that enable them to learn from each other.
 - Ethical leadership depends on the understanding of legal boundaries, and the norms and beliefs of stakeholders. The APMBOK acknowledges that moral values vary across countries and cultures. The project manager must ensure that values and codes of conduct are clearly defined and communicated towards the team members.
 - Project managers must support the learning and development of staff. The organisation's development programme typically encourages individuals and supervisors to identify gaps for competence development.
- **Delivery** includes dimensions relevant to the project delivery process. Those process areas deal with scope, time, finance, risk, quality, and resource management (cf. APM 2012, p. 91). The dimension of mobilisation proposes to provide necessary infrastructure (e.g. IT and telecoms or plant and machinery) for PP&P management. This includes PP&P software and teleconference systems for international, virtual teams (cf. APM 2012, p. 206).

3.6.4 Applied Research

Young et. al. researched in 2014 at the Australian Federal Government by collecting secondary data from a previous assessment including interviews. The analysis resulted in the maturity level of each dimension at each process level (cf. Young Michael 2014, p. 223).

In 2015, Narbaev conducted a PMMM (P3M3 version 2010) assessment via questionnaire in Kazakh companies. This study focused on PjM3 only. They referred to the questionnaire as being complex. A low score in overall maturity showed that PM tools and methods are not used effectively in Kazakhstan (cf. Narbaev 2015, p. 16).

Backlund, Chronéer and Sundqvist used the P3M3 (version 2010) in project-oriented construction companies in Sweden. A P3M3 assessment was conducted including all perspectives. The main findings considered a lack of customer and stakeholder relationship building. They incorporated their feedback related to the P3M3. From their angle, the P3M3 lacks on softer aspects like culture. They criticise that the model does not feature learning

from projects and indicate that this should be incorporated into the maturity assessment. And lastly, participants had problems in understanding difficult questions and vocabulary. Similar to the assessment of Narbaev, only process dimensions have been covered in the assessment. (cf. Backlund Fredrik; Chron er Diana; Sundqvist Erik 2015, p. 12–15).

3.7 IPMA-Delta

The International Project Management Association (IPMA) was the first project management association worldwide. Their focus lies primarily in the development of individual project competences through training, mentoring and coaching (cf. Bushuyev 2014, p. 303). Since 2012, the IPMA is offering their OPMMM assessment and certification called the IPMA-Delta. The overall model framework consists of three different modules as shown in Figure 8 (cf. Wagner et al. 2016, p. 53; cf. Szalajko et al. 2016, p. 24):

- The Individual Competence Baseline (IPMA ICB = I-Module) is used to assess the competence of individuals.
- The Project Excellence Baseline (IPMA PEB = P-Module) assesses the application of project management processes.
- The Organisational Competence Baseline (IPMA OCB = O-Module) is used for assessing organisational project management practices via an external assessment.

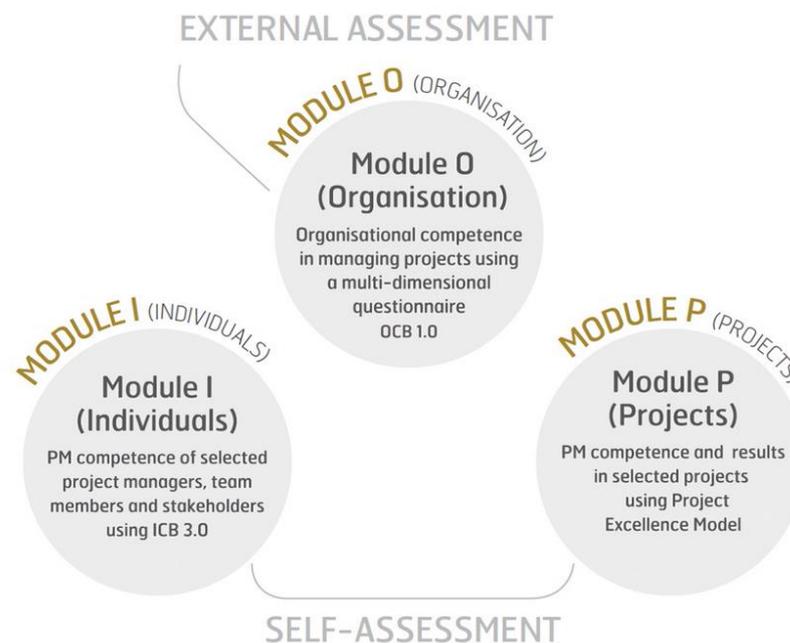


Figure 8 Structure of the IPMA Delta

Source: IPMA 2020

As modules concerning project management practices were excluded (see section 2.2), only the OCB and the ICB are used for further analysis. All these three frameworks are defined as generic models that are applicable across all types of organisations or cultures. It is upon the user to decide on how they can be tailored to be applied in a specific organisational context (cf. Wagner 2014, p. 11). The IPMA-Delta assessment is resulting in a gap between actual and desired state ("delta"). This delta is the basis for defining improvement activities OCB (cf. Wagner et al. 2016, p. 65).

3.7.1 Assessment Dimensions

Each of the individual modules consists of an own set of dimensions. This section summarises each module separately.

3.7.1.1 Organisational Competence Baseline (OCB) version 1.0

The OCB “...addresses the ability of organisations to integrate and align people, resources, processes, structures and cultures in projects, programmes and portfolios within a supporting governance and management system” (Wagner et al. 2016, p. 7). The initial release (version 1.0) of the OCB is outlined below. Later, this version will be compared to the most recent publication (version 1.1). The OCB is comprised of the following five groups of dimensions (cf. Wagner 2014, p. 25–32):

- **PP&P governance:** Long-term development of an organisation’s PM-competence should be guided by its PP&P mission, vision and strategy. This is part of corporate governance. This dimension ensures the strategical alignment of the project governance with the organisation’s overall governance and management system. This is usually steered by top management also giving directions for a sustainable development of PM-competences. Additionally, development through knowledge management via lessons-learnt reviews and exchange of experience is covered. Governance also contains a leadership dimension that requires communication of clear goals for PP&P.
- **PP&P management:** This dimension includes the definition and development of PM-standards. This requires establishing processes, structures and tools for PP&P management.
- **PP&P organisational alignment (integration):** This building block considers the integration of PP&P in the organisational structure, external and internal processes and culture(s):
 - o **Organisational structure:** Alignment between the temporary project organisation and the permanent line organisation. Structural alignment also considers all organisational units and functions involved to effectively manage projects: roles for PP&P, a PMO, steering boards, and teams. Standards for aligning structures are set by top management.
 - o **Processes:** Integration of internal and external processes in PP&P. Hence, this means to align organisational structures with project management. For example, alignment of product and support processes with processes used in PP&P, as well as with external partners like customers.
 - o **Culture:** This aspect considers cultural dynamics in international projects as well as within or between organisations. Social groups naturally develop a certain culture. There can be different corporate cultures within one organisation (e.g. departments, subsidiaries, project teams, etc.). Additionally, temporary organisations like projects will develop a project-oriented culture. People within this project-oriented culture must be aware of different cultures of internal and external partners in order to establish effective working relationships and avoid conflicts. Acknowledging different cultures in an organisation will lead to better alignment between the organisational culture and different (temporary) project-

cultures, leading to better cooperation. The role of the top management is to maintain a project-friendly corporate culture and to ensure the alignment of project culture with the cultures of related internal and external parties. They further need to define and foster necessary standards such as ethics, code of conduct and training (cf. Wagner 2014, p. 55–56).

- **PP&P Personal competences:** Managers of PP&P need to build effective and competent teams. Those competencies should be transparently defined for managers, team members and staff interacting with such. Hence, recruiting and development activities are based on those roles with the purpose to support the development of organisational competence in managing projects. The detailed definition of this dimension is covered by the IPMA ICB.
- **PP&P Resources:** When developing organisational competence in PM, also resources like software tools, intellectual property rights, equipment, or facilities need to be considered. This can be everything that relates to PP&P management.

The IPMA-Delta offers a competence development programme on the organisational level that allows an organisation to develop competences in managing projects on their own. The organisation must commit to achieve desired states of competence by setting goals and objectives that are aligned with the organisation's strategy. During implementation, also commitment throughout the firm is necessary for achieving success. Here, the creation of an open culture based on trust and collaboration is proposed (cf. Wagner 2014, p. 34–35). Top management should proactively implement standards for competence development. These standards include the collection and documentation of lessons-learned, building communities of practice and sharing experiences (cf. Wagner 2014, p. 46). All dimensions described above need to be aligned with the mission, vision and strategy aiming to achieve intended results in managing projects (cf. Wagner 2014, p. 21).

3.7.1.2 Individual Competence Baseline (ICB) version 3.0

The focus of the ICB is the competence of the individual. Here, IPMA uses a general definition of competence: "*Individual competence is the application of knowledge, skills and abilities in order to achieve the desired results*" (Sedlmayer et al. 2015, p. 15). The ICB version 3.0 published in 2006 was used for the analysis. Later the most recent version 4.0 published in 2016 is used for analysing the evolution. The ICB defines the following three competence areas:

- **Contextual competences** (cf. Caupin et al. 2006, p. 128–154):
 - o PP&P Orientation means that the organisation orientates to managing by projects and the development of competence in project management.
 - o PP&P Implementation includes ongoing change management intending to establish the concept PP&P management in the organisation. The element permanent organisation and business ensure the alignment between the temporary (project) and the permanent organisations. The business dimension requires projects to be aligned with business needs. The dimension of systems, products & technology covers the linkage between PP&P and systems, products and technologies that they affect. The project team needs to understand their impact that the project generates. For example, they need to understand the product development process as well as the role of the product manager.

- Personnel management deals with the development of employees working in projects. This includes the identification of requirements in terms of skills, knowledge, experience, and behaviours, in order to select the right people. A project leader needs to monitoring personnel situations and motivations and can discuss their performance, personal issues and development opportunities. Also, documentation of lessons-learnt is part of personnel management.
- Health, Security, Safety & Environment is a dimension that helps to ensure that the organisation behaves appropriately. This includes identifying applicable laws and regulations, reporting and identification of health, security, or environmental issues and risks.
- **Behavioural competences** (cf. Caupin et al. 2006, p. 86–122):
 - The first dimension is Leadership that means motivating others and giving directions. It entails the ability to determine the leadership style appropriate for a specific situation and compatible with one's own style. A project manager needs to be able to review his/her leadership performance through feedback aiming to modify the approach.
 - Engagement & Motivation requires to be aware of the needs of all parties involved and of interests of individuals on the project. To be aware of the different motivational needs of each project member enables the project team to get together behind a common goal.
 - Values Appreciation is the ability to understand the intrinsic qualities of other people and their point of view. Further, acknowledging (respect and appreciate) other opinions, values, and ethical standards of different parties influencing the project. Hereby, building mutual respect is the basis.
 - Ethics requires that the morally accepted code of conduct of every individual. Ethics should be respected to allow people to act without moral conflict. Additionally, the project manager needs to ensure that certain ethics fully complied with. A project manager needs to consider that social and cultural differences can also reveal differences in ethics.
 - Self-Control is the disciplined approach to deal with daily work, changing requirements and stressful situations. The overall goal is to identify stress levels and reduce them by analysing one's own working behaviour.
 - The ability to be persuasive and authoritative is embedded in the Assertiveness dimension. This also includes cultivating sustainable relationships with interested parties. This helps to ensure the effectiveness of project managers communication ability. This is also related to the dimensions of Openness, that requires to be open to issues such as avoiding discrimination based on age, gender, sexual orientation, religion, cultural differences, or disabilities.
 - Consultation is the competence to reason, listen to other points of views, and to negotiate to find solutions.
 - Negotiation skills require to listen carefully and understand the other's position.
 - Conflict & Crisis considers the management of different interests that require to act with transparency and integrity.
 - Reliability enables the creation of trust by keeping one's word and delivering commitments. Relationships in the team should be built on mutual respect, trust and reliability.

- Further Creativity and Results Orientation are required.
- **Technical competences** (cf. Caupin et al. 2006, p. 40–79):
 - Project members need to be able to identify and manage Interested Parties (stakeholder management) that requires Communication and Quality Management skills.
 - Project Organisation covers the maintenance of appropriate roles, organisational structures, and responsibilities for the project. The project organisation should also take cultural and environmental influences into account (e.g. geographically dispersed teams). A project manager can build the right project team in terms of competences by reviewing skills, knowledge, experience as well as personalities of individuals.
 - Teamwork covers the management and leadership of team building, working in teams and group dynamics (e.g. motivation, team goal setting, social events and supporting strategies). This dimension also requires managing issues arising due to differences in culture, education, or interest. The project manager should assess development needs together with the line manager and take appropriate actions.
 - Change Management deals with unexpected changes in project objectives.
 - There is an own dimension on Communication, which requires to select the appropriate form of communication (e.g. written or oral, formal or informal) as well as creating a communication plan and to ensure confidentiality. This includes communication management (e.g. identification of communication needs) addressing all relevant stakeholders.
 - Other dimensions that need to be mentioned are Problem Resolution, creating the right Project Structures, the definition of the Scope and Deliverables.

3.7.2 Levels of Maturity

Instead of maturity levels, the IPMA-Delta defines five competence classes that support the continuous maturation (cf. Wagner 2012, p. 54; cf. Wagner et al. 2016, p. 66–69):

3.7.2.1 Class 1: Initial

There are experienced project managers in the company. However, no defined standards, structures or processes exist to enable PP&P management. Top management should initiate an organisational competence development programme according to the OCB. An individual competence development programme is situated and supported by senior executives.

3.7.2.2 Class 2: Defined

Standards, structures and processes are partly defined and applied. Understanding of PM-standards based on application. Centralised management structures are introduced to govern and manage projects.

3.7.2.3 Class 3: Standardised

The organisation, project management standards, structures and processes are completely defined and fully implemented. Project results are benchmarked with other organisations. Top management and senior management are fully involved and demonstrate real commitment. Full understanding on PP&P management exists that is entirely aligned with the organisation.

3.7.2.4 Class 4: Managed

To reach class 4, an organisation must prove that the implemented PM standards are fully controlled and corrective measures in place, including regular comparisons with the organisational objectives.

3.7.2.5 Class 5: Optimising

At this stage, the organisation is underlying a continuous improvement cycle. All staff members are committed to their respective PM-role and continuous personal development.

3.7.3 Development

The first version (1.0) of the OCB published in 2014 was compared to the most recent version (1.1) published in 2016. One major change identified can be found in the Leadership dimension that states that effective communication should be supported by using all kinds of media, tools and formats. These include face-to-face meetings, but also internet seminars and social media (cf. Wagner et al. 2016, p. 86). Besides that, no major changes were made regarding transnational PM.

The ICB version 3.0 published in 2006 was compared with the most recent version (4.0) published in 2015. The fundamentals of version 3.0 already state that the culture of companies, organisations, and economies/countries need to be considered (cf. Caupin et al. 2006, p. 4). However, when looking at version 4.0, a number of changes can be identified. Now, the IPMA distinguishes between people (=behavioural), perspective (=contextual) and practical (=technical) competences. The first result of the comparison is that the number of dimensions addressed was reduced. Perspective competences went from 11 down to 5, people competences from 15 to 10 and practice competences from 20 to 13. The new version emphasises that an organisational culture must be developed, in which competence development is perceived to have added value and contributes to the advancement of the organisation (cf. Sedlmayer et al. 2015, p. 22). Changes in terms of transnational project management within these dimensions are outlined below:

- **Perspective (=contextual) competences** (cf. Sedlmayer et al. 2015, p. 58–63):
 - o A new dimension Power and Interest deals with recognising and understanding of informal interests of individuals and groups including the resulting politics and the use of power. This also contains the ability to influence the behaviour of others. An individual must be aware of the informal and for the most part implicit knowledge about culture and values.
 - o The most recent version introduces its own dimension called Culture and Values. This refers to the ability of the individual to align the project culture with the

organisational culture and to disseminate its values into the project. In a multi-cultural project, the individual needs to acknowledge relevant culture(s) internally and externally. This is an ongoing process that requires to periodically realign the project's culture accordingly. Cultural (and values) awareness and respect are part of the required set of skills. This is related to different people and practice competences as well. Those include Personal Communication, Relationships and Engagement, as well as Project Design and Quality. The ICB suggests different supporting methods, like published research, the use of codes of conduct or lessons-learned aiming to improve the cultural alignment in future projects.

- **People (= behavioural) competences** (cf. Sedlmayer et al. 2015, p. 69–105):
 - Self-Management which contains the dimension Self-Control was enhanced with Self-Reflection. This new dimension requires that the individual acknowledges the influence of his or her emotions, preferences and ethical values. The individual needs to understand their impact which is important to make sense of other opinions and, in doing so, reduce the effect of bias.
 - Personal Communication and Teamwork were moved from technical to behavioural competences. An enhancement of the purpose of personal communication is to enable the individual to communicate effectively across cultures. This also entails the ability to communicate with virtual teams across time zones and requires using modern communication technologies and to consider aspects like language. The Teamwork dimension requires the ability to build (meetings, workshops) and actively manage (e.g. enhance networking and cooperation) a good team. The team leader needs to stimulate networking, physically and virtually by using tools for collaboration. Here, also the awareness of problems due to cultural or educational differences was added.
 - Relationships and Engagement was added and stands as a foundation for productive collaboration. The ICB acknowledges that cultural differences can enhance interest and attractiveness in relationship building but also lead to misunderstandings that endanger the quality of a relationship. The individual takes others seriously by appreciating their opinion, regardless of their background. It states that cultural diversity is respected.
 - The Leadership dimension requires personal self-awareness, decision-making, to show commitment, to initiate actions and proactively offer help. A project leader should act as a mentor and needs to know when to use what means of power and how to communicate actions of power. A related competence element is to consider different cultures and values.
 - The individual also needs to resolve conflicts between two or more parties. This includes the ability to identify potential conflicts and to use suitable moderation techniques. Related competencies are also Culture and Values as well as Power and Interest.
 - Also, the dimension of Negotiation includes the analysis of cultural aspects and tactics now. Here, this dimension is intending to reach a common agreement and commitment while keeping a positive working relationship.
 - The ICB 3.0 dimension of Ethics was split into the people dimensions of Personal Integrity and Reliability (acknowledge and apply ethical values to all actions) and

Culture and Values that requires that the values of a society are known by the individual. Also, the practice competence Compliance, Standards and Regulations considers ethics, which requires the project to comply with all relevant codes of conduct and regulatory standards (cf. Sedlmayer et al. 2015, p. 195). Lastly, Resourcefulness should enable individuals to effectively handle uncertainty, changes and stressful situations (cf. Sedlmayer et al. 2015, p. 100–110).

- **Practice (=technical) competences** (cf. Sedlmayer et al. 2015, p. 115–116)
 - The individual must be able to prioritise and translate demands into a Project Design. Then to define requirements and objectives and further translate this into a specific scope.
 - The dimension of Project Design states that cultural aspects, as well as personal and group interests in the organisation, should be taken into consideration. Cultural norms refer to the organisation and the wider society. The emphasis lies also within the exchange of lessons learnt.
 - Change and Transformation requires to ensure that project outcomes are being applied. Hence it is required for a project manager/team to help people change. This depends on the amount of disruption caused, plus attributes such as culture, value system or their history with past changes (cf. Sedlmayer et al. 2015, p. 177).
 - The dimension Interested Parties was renamed into Stakeholders and includes similar content

Summed up, the development of the ICB shows clearly that transnationalism plays a crucial role. Even though the ICB 3.0 standard published in 2006 already recognises culture and values in different dimensions, this aspect was further developed and even owns a more central place in the ICB 4.0.

3.7.4 Applied Research

Bushuyev gave a rough summary of the benefits identified during the first IPMA Delta assessment on improving PM at the Chernobyl Nuclear Power Plant (Ukraine) in 2009. The project led to top management commitment and strategic orientation towards developing PM capabilities. It is also stated that besides the PM methodology, PM competences of people involved were considered. This also includes improvements in communication between projects and their stakeholders (cf. Bushuyev 2014, p. 309–310).

Bushuyeva et. al. assessed IT projects in Ukrainian financial service companies in 2018 using two of the three models including IPMA ICB 4.0 and OCB. The assessment was split into strategical, behavioural and technical competences. Ideal patterns of assessment were compared to the real assessment results. Strategic competencies included the dimensions of Culture and Values as well as Power and Interest. The behavioural competences consisted of the ten people dimensions from the ICB 4.0. The results on the assessed people competences based on the ICB 4.0 (outlined in 3.7) are visualised in Figure 10. Main outcomes were the lack of teamwork and negotiation skills. Those were used to create a development plan for project managers (cf. Bushuyeva et al. 2018, p. 228–229).

Another assessment was performed in the Russian Ministry of Industry and Trade in 2019 by Osmakov et al. The basis for the assessment included the OCB and the PEB. The objectives for the evaluation included organisational support for project management, corporate standards, as well as the personnel and project management culture of the enterprise. A case study conducted revealed the development of a project management culture as especially important. The area of project management culture focused on education and certification in project management. However, the assessment also showed that this area scored relatively low (cf. Vasili Osmakov et al. 2019, p. 14).

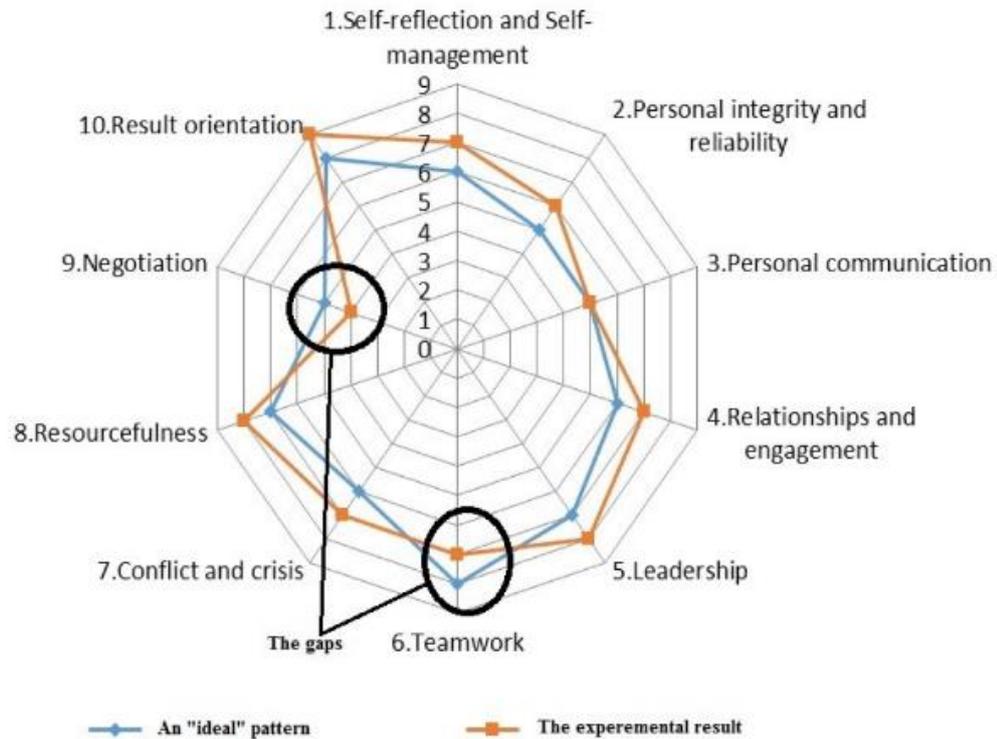


Figure 9 Behavioural Competence Assessment

Source: N. Bushuyeva et al. 2018, p. 228

4. Structured Comparison

In the previous chapter, all relevant OPMMMs were outlined, including a detailed investigation of the individual frameworks, their development and findings from applied research. In this chapter, all findings are presented and compared in a structured way. Results are created by extracting dimensions from the OPMMM summaries. These summary sheets can be found as follows:

- **KPMMM** (Kerzner) in chapter 3.2
- **Prado-PM** in chapter 3.3
- **OPM3** and the referenced **PMCDF** in chapter 3.4
- **Gareis-PM** of the Project-Oriented Company (POC) in chapter 3.5
- **P3M3** and the referenced **APMBOK** in chapter 3.6
- **IPMA-Delta** that is split into **OCB** and **ICB** in chapter 3.7

The dimension was selected for the comparison if it is related to the research questions. This means, that the dimension supports challenges²⁹ that can arise due to transnational project management. This is the reason, why process constructs (e.g. project portfolio management) are only mentioned if they support transnational project management.

The structure of the comparison follows the common design of OPMMMs analysed. This led to three different categories shown in Figure 10, including a reference to the corresponding section.

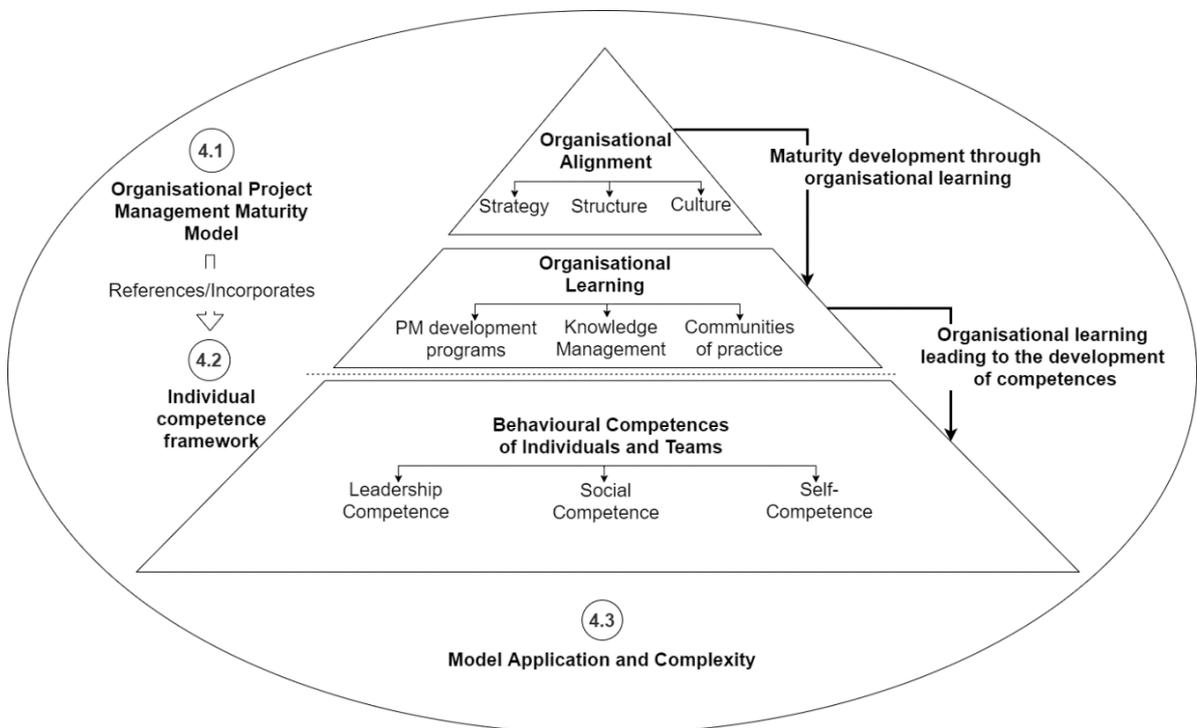


Figure 10 Components of Organisational Project Management Maturity Frameworks

Source: Own Creation

²⁹ These challenges are defined in more detail in Appendix B9.

All models start with the definition with dimensions on an organisational level (section 4.1). This definition comprises the organisational strategy, structure and culture. However, the comparison doesn't always show how the dimensions around organisational alignment contribute positively to transnational project management. Consequently, some of the organisational dimensions were defined by existing research on improving project management on an organisational level. Within OPMMM frameworks, organisational learning is used as a means of maturity development. This focus area is an important connector between the organisational and the individual competence frameworks (see Figure 10) and therefore included in the organisational view.

At the same time, models increasingly extend their scope towards the competence development of employees and teams that work in projects. Those models realise this by utilising different individual competency frameworks. Hence, the second category is dealing with dimensions that enable individuals and teams to work in international projects (section 4.2). It must be pointed out that the most recent versions of Prado (2014) and Kerzner (2019) both reference either to PMI or IPMA standards or best practices aiming to continuously develop capabilities. To gain a complete picture of available PMMMs, the **ESPM3**³⁰ and the **CCS-PMMM**³¹ are included in the comparison on individual and team levels as well. The decision to include them is rooted in their origin and the reasons for their creation. Those reasons are based on differences in culture and industry. As the comparison showed that the ESPM3 and the CCS-PMMM focus on improving single PM rather than the OPM, they were excluded on the organisational level.

In the third category, the author takes one step back and compares the models in terms of application, as well as complexity in terms of frameworks, dimensions or best practices (section 4.3).

The goal of the structured comparison is to obtain a broad view of how models consider project management on a transnational level. In the following, the comparison is made on a chronological timeline to provide a better overview of the evolution of the models. Each paragraph is one building block of the overall comparison. Those blocks are presented as comparison results in section 4.4 and can be directly linked by the headline of the paragraph.

4.1 Comparison on Organisational Dimensions

Not all dimensions can be directly related to transnational aspects. However, naturally, transnational project management comes with complexity³² that derives from geographically dispersed project teams and higher numbers of internal and external interfaces like subsidiaries, departments or institutions (cf. Albrecht; Spang 2014, p. 297). Management commitment, governance structures and cultural alignment on organisational level help to create a stable environment to cope with project complexity (cf. Torres 2014, p. 139–142). Hence, the following sections outline these identified organisational dimensions that have a positive impact in terms of project management.

³⁰ The Evolutionary Software PMMM is described in Appendix C1.

³¹ The Construction Consulting Service PMMM is described in Appendix C2.

³² See Appendix B9.

4.1.1 Organisational Commitment and Structural Integration of PM

The commitment of upper management on the development of organisational project management: This dimension implies that organisational leadership must have an understanding of the importance and necessity of developing project management capabilities (cf. Cooke-Davies; Arzymanow 2003, p. 474). Without guidance, a project team may be tempted to develop their own working culture within the project environment (cf. Ochieng 2009, p. 533). Since the earliest publication in 2001, there is a mutual agreement of all models that top management must commit to the development of PM. Most models state that full and real (visible) commitment must be in place as a prerequisite for development. They see it as a long-term strategy that considers the development of OPM including staff working in projects.

Alignment of project management with the organisational structure and strategy: All models emphasise the implementation of a project governance that is optimally aligned with the organisation's strategic objectives. Except the KPMMM, all models utilise project portfolio management to ensure this strategic alignment. Usually, project objectives are derived from strategic objectives or initiatives. Additionally, all models (OPM3 since 2013) except Kerzner agree upon the alignment of organisational structure in order to integrate the project management organisation. Here, Kerzner (2001) takes an alternative position and states that organisational restructuring is unnecessary if the corporate culture strongly supports project management (cf. Kerzner 2001, p. 136).

Supportive organisational structures are in place: This dimension guarantees that clear roles and responsibilities are defined, PP&P management is in place and a central PMO is implemented (cf. Nieto-Rodriguez; Evrard 2004, p. 5). Here, PP&P management further ensures strategic alignment (cf. Gareis 2004, p. 135). Comparing all models, a general agreement on necessary structures such as a PMO as the central place for PM development, and a standard PM-lifecycle can be identified. When it comes to PP&P management, the KPMMM (all versions) is the only model that only considers that knowledge on project programmes is in place but does not require that PP&P management is implemented on an organisational level. All other models highlight that the implementation of PP&P management is a central component including clear definitions on how to do it.

IT support: The KPMMM (2001), OPM3 (2003), Gareis (2004) and Prado (2006) state that a selection of appropriate PM software, which supports the methodology, is necessary. The KPMMM additionally proposes to include software education for executives to encourage them in using the tools. The APMBOK (2012) incorporates an own dimension that considers providing necessary infrastructure (e.g. IT and telecoms or plant and machinery) for PP&P management. This includes PP&P software and teleconference systems for international virtual teams. The most recent edition of the OPM3 (2013) requires management systems that encourage the reuse of best practices, proven techniques and furthermore enables knowledge sharing. And, like the KPMMM, Gareis and Prado, the OCB (2014) requires that certain standard tools are used for PP&P management. The most recent version of the OCB (2016) highlights effective communication that includes the use of internet seminars and social media.

4.1.2 Organisational Culture Alignment

Alignment of the organisational culture³³ with project management: The KPMMM (2001) and Gareis (2004) consider that the organisational culture incorporates values aligned with project management. The KPMMM highlights the corporate culture as being substantial when improving OPM. Gareis agrees with this standpoint, defining that strategy, structure and culture need to be aligned in order to become a POC. The OPM3 (2013), the IPMA OCB (2014) and P3M3 (2015) adopt this concept and require a supportive organisational culture that embraces project management. Even though most models require the alignment of the organisational culture with project management, only the IPMA OCB (2014 and 2016) acknowledges that it takes the complete picture of internal and external cultures. These include different corporate cultures (departments, subsidiaries), as well as international environments. The OCB states that acknowledging different cultures will lead to better alignment between the corporate and the various (temporary) project cultures.

The organisational culture fosters teamwork values and fosters PM and includes community values like cooperation and trust: An organisational culture should support innovation and change (cf. Cleland; Ireland 2006, p. 471; cf. Pasian Beverly 2014, p. 198) and foster a set of values that actively support team collaboration, such as communication and cooperation (cf. T. L. Doolen; M. E. Hacker; E. M. Van Aken 2003, p. 293). Also, the CCS-PMMM (2020) considers that the organisational culture should incorporate certain community values that facilitate project management (e.g. teamwork). Comparing the OPMMMs, the KPMMM (2001), OPM3 (2003) and IPMA OCB (2014), it is found that all of them require a corporate culture that is based on trust, collaboration, communication, and cooperation. The OPM3 (2013) and the IPMA OCB (2014) additionally emphasises that the top management needs to foster necessary standards such as ethics (see section 4.2.3) and a code of conduct. The questionnaire contained in the Prado-PMMM (2014) only touches upon this point by requiring that leadership personnel create a prevailing organisational climate of low stress. However, Prado does not state how this should be done. In the most recent version published by Gareis (2018), cultural aspects receive more attention as well. The dimension networking between projects requires a cooperative culture that fosters horizontal communication and mutual trust as central values.

4.1.3 Organisational Learning

Introduction of knowledge management through lessons learnt: In between diverse teams, in which project members are working across nations, usually not much informal communication and networking takes place. Therefore, knowledge management and sharing of lessons-learnt become more important (cf. Pazderka; Grechenig 2007, p. 88). All OPMMMs cover knowledge management through the documentation of lessons learnt. Gareis (2004) introduces expert pools, that inherit the project management responsibility of situating knowledge management across their business area (e.g. marketing expert). The KPMMM (2001), P3M3 (2008) and the IPMA OCB (2014) complement this with the

³³ See Appendix B1.

approach of openly sharing experiences throughout the company (see “*Introduction of communities*” of practice below).

Introduction of a common working and documentation language: Diverse teams have members with different native languages. Even with a common working language (e.g. English) increased misunderstanding and conflict can occur. The suggestion to mitigate this issue is to define a common working and documentation language. This also relates to employee development, where the need to enhance the proficiency in this language needs to be underlined (cf. Pazderka; Grechenig 2007, p. 86). Even though this action is proposed in the literature, none of the OPMMM incorporates this best practice. Instead, the models focus on establishing a common project management terminology in English. Most models (KPM3, Prado-PM3, ESPM3, OPM3) refer to PMI standards, like the PMBOK®. Others use their own standards (IPMA, APM).

Introduction of project management development programmes/career paths: Within the area of OPMMM, the focus is laid on if and how development programmes are considered. This dimension is considered to have a significant impact on employee satisfaction, hence it is an important aspect in team performance (cf. T. L. Doolen; M. E. Hacker; E. M. Van Aken 2003, p. 292). All models agree on the establishment of competence development programs in project management. There is a special emphasis on career paths that contain on-going curriculums. Models that have focused on technical project process aspects in their earlier versions (Prado, OPM3, P3M3) now also contain behavioural dimensions. Those dimensions are covered in section 4.2. Additionally, Kerzner (2001), OPM3 (2003), Prado (2014), and the most recent version of the IPMA OCB (2016) require cultural support regarding the development of project management staff. For example, the IPMA OCB (2016) requires that the perception of training having added value and contributing to organisational development needs to be embedded in the corporate culture.

Introduction of communities of practice: Organisations can utilise communities of practice on an organisational level, leading to cross-organisational development of individuals through events (cf. Sedlmayer et al. 2015, p. 19). Only half of the models consider communities of practice as a possible way for organisational learning. Gareis (2004) puts importance on networking between projects to identify synergies and as an enabler for relationship building. The APMBOK (2012) contains an own dimension named Communities of Practice. Those are groups of people who develop expertise through regular interaction. Knowledge can be won through the discussion of experiences, stories, tools, etc. During the interaction, members need to act ethically (see ethical behaviour in section 4.2.3). Through this process, relationships can be built which enable members to learn from each other. The IPMA OCB (2014) also sets up communities of practice on an organisational level which interact regularly. These regular events should also enhance the development of the organisation. The P3M3 (2015) and Kerzner (2019) adopted this concept to enable cross-organisational development.

Acknowledges that competency development may vary depending on country and culture: Solely the PMCDF (2017) is citing the argument that the approach of competency development may vary depending on country and culture. Therefore, an understanding on culture must be created before deploying the model.

4.2 Comparison of Individual- and Team-Competences

Most frameworks differentiate between technical or process capabilities (hard skills) and behavioural or personal abilities (soft skills). For the sake of this thesis, purely technical aspects of project management were disregarded. Therefore, key behavioural dimensions, which are characterised to be influential on a transnational level, were identified. Those are classified into the following three categories:

- Competences directly related to leadership in project management
- Social competences as a potential for communicative and cooperative behaviour that are required to be successful in social interactions
- Self-competences such as intrinsic abilities that enable to deal with and understand oneself and others

4.2.1 Leadership Competences

Project leaders can adopt an appropriate leadership style, can identify and make use of power: Kerzner (2001), Gareis (2004) and Prado (2006) only state that leadership needs to be considered, however, they do not provide further insights. The ICB (2006) highlights that there is a correlation between motivating others and determining the appropriate leadership style for a specific situation. Personal skills required are to act with integrity and to keep commitments. This, in turn, requires acting with sensitivity and genuine interest regarding feelings and values of others. In the ESPM3 (2007) and the KPMMM (2019), the project manager also needs to be capable of understanding different leadership behaviours including how and when to apply those. The ESPM3 further includes leadership skills such as to inspire, motivate and direct people, and making a decision. In the PMCDF (2007) leadership programs as well as methods for leading (guiding, inspiring, motivating) are considered. While the second edition of the P3M3 (2008) does not consider leadership at all, the most recent version (2015) requires that project managers can select an appropriate leadership style. The most recent version of the ICB (2015) highlights the ability to know when and how to use what kind of power. All actions of a leader should be interrelated with the ability to acknowledge differences in cultures and values. Gareis (2018) introduces value-oriented leadership as core-competency of a project manager. Here, the project manager can reflect on, and adapt his or her behaviour accordingly. A complementing statement can be extracted from the CCS-PM3 (2020) that states that a balanced set of leadership skills allows to more effectively work in and influence the culture and politics of a project environment.

Project leaders can disseminate the organisational culture into the project culture: The ESPM3 (2007) is the first model that includes an own dimension of organisational culture dissemination. It requires that project managers can disseminate and adopt the values incorporated in the organisational culture throughout the project team. By doing so, the project leader conveys a sense of identity among team members and enhances the stability of the internal social system. Further, the ICB (2015) added an individual dimension called Culture and Values that also refers to the ability to align the project culture with the culture and values of the organisation. Like the ESPM3, the most recent version of the

PMCDF (2017) requires the ability to disseminate the organisational culture of respect and ethics into the project culture. Gareis (2018) emphasises on value-oriented leadership (see 3.5.3) that also comprises the ability to transfer the value system and the code of conduct incorporated in the organisational culture towards the project team. This also contains the ability to reflect and adapt behaviour and action or values. The CCS-PMMM (2020) adds the ability to reflect on corporate values in the dimension of trust.

Team composition, building and development: The third edition of the ICB (2006), the second edition of the PMCDF (2007) and the ESPM3 (2007) require that the project manager needs to select the right team members based on skills, knowledge, or behaviour, and develops them with different methods like team building and mentoring. This also covers the ability to identify and consider issues due to cultural, or educational differences when building and developing team members. The APMBOK (2012), Gareis (2018) and the CCS-PMMM (2020) adopt this ability in their most recent versions. While the APMBOK and the CCS-PMMM require considering individuals that function well together during team selection, Gareis takes one more step and adds team building activities with the ability to accept differences and different opinions (e.g. due to cultural differences).

4.2.2 Social Competences

Teamwork, cooperation and creation of trust: In the ICB (2006), relationships need to build on mutual respect, trust and reliability. This is complemented by being open to issues such as discrimination on age, gender, sexual orientation, religion, cultural differences, or disabilities. Also, the ESPM3 (2007) refers to the ability to encourage group identity and norms when building the team. The PMCDF (2007) underlines the ability to manage a diverse workforce that requires the development of trust and to ensure adherence of cultural issues by respecting personal, ethnic, and cultural differences. The APMBOK (2012) adopts these concepts. Project leaders need to be able to use influencing methods to build relationships on shared values, ethical positions, trust and respect. To gain trust and the development of teamwork are required. Here, professional behaviour promotes trust. It is the only framework that contains the ability to hand over authority to perform responsibilities of, or act on behalf of, another. This further requires matching the work to behaviour and competences of the delegated resource. Within *teamwork*, different cultural backgrounds, or working environments must be considered. The teamwork dimension in the most recent version of the ICB (2015) was moved from a technical to a behavioural competence that requires to actively manage the team (meetings, workshops) with the goal to enhance networking and cooperation. Gareis (2018) states that emotions (anger, fear, joy, sadness, etc.) should be observed and actively approached. Measures are team building for integrating team members (e.g. from different cultural backgrounds). This should be the basis for good cooperation. Then, teams create their own project culture that fosters teamwork and collaboration. The CCS-PMMM (2020) puts the main emphasis on the development of trust for building team cohesion. This includes certain actions such as reflection on organisational values or clear and regular communication.

Relationship-building: In the ICB (2006) the assertiveness dimension includes cultivating sustainable relationships with interested parties. This is also related to the dimensions of openness that requires to acknowledge cultural differences. Relationships in the team

should be built on mutual respect, trust and reliability. The ESPM3 (2007) defines trustworthiness also as the basic requirement for successful cooperation. The ESPM3 highlights that all relationships related to the implementation of a project are based on trust. The leadership dimension in the PMCDF (2007) embeds relationship building that requires to effectively maintain relationships appropriate to the team and local culture. The most recent version of the ICB (2015) incorporates an own dimension of relationship and engagement. This dimension acknowledges that cultural differences can enhance interest and attractiveness in relationship building but also lead to misunderstandings that endanger the quality of the relationship. The individual takes others seriously by appreciating their opinion, regardless of their background, cultural diversity is respected. While the APMBOK (2012) acknowledges that relationships need to be built on shared values, ethical positions, trust and respect; Prado (2014) only partly covers this dimension, as relationship building is proposed in the most recent version 2.2 of the questionnaire but without further specification. Gareis (2018) solely considers relationship building towards stakeholders³⁴.

Communication management: The first versions of Gareis (2004), Prado (2006), and the P3M3 (2008) only partly consider this dimension. In contrast, Kerzner (2001), the ICB (2006) and the PMCDF (2007) feature the ability to select an appropriate form of communication, listen actively, and adopt communication appropriate to the audience. The ESPM3 (2007) allocates attributes of openness and honesty that need to be encouraged during communication. The ability to communicate across different cultures with sensitivity gains more emphasis in the most recent versions of the APMBOK (2012), the ICB (2015), the PMCDF (2017) and Gareis (2018). The APMBOK also stresses the importance of identifying communication barriers, like lack of a common language or understanding across disciplines. This was also adopted by the CCS-PMMM (2020), which highlights the significant impact of communication on the efficiency and effectiveness of the construction process which becomes even more important in culturally diverse teams.

Conflict management: In the ICB (2006), “Conflict & crisis” considers the management of different interests that require to act with transparency and integrity. Reliability enables the creation of trust by keeping one’s word and fulfilling commitments. The managing dimension of the PMCDF (2007) includes effective conflict-management by genuinely valuing and respecting the input and expertise of others and the willingness to learn from other opinions. The ESPM3 (2007) highlights that conflicts should be identified and resolved in an early stage. Teamwork must be facilitated and promoted by the project manager. Consensus building can be handled via listening and understanding reasons for de-motivation. The APMBOK (2012) requires sensitivity and empathy, objectivity, recognising levels of authority and ethical stance. Actions may be recognising levels of authority and power, reflecting perspectives and expectations, or to focus on the issue. In the most recent version of the ICB (2015), the dimension “Conflict & Crisis” also requires the utilisation of moderation techniques and competencies related to the awareness of cultural and values as well as power and interest.

Negotiation skills: Except Kerzner (2001), all models require negotiation skills. The ICB (2006) states that a working relationship must be maintained in order to reach a common agreement. Establishing a working relationship includes cultural analysis and tactics. In the

³⁴ see Appendix B5.

ESPM3 (2007) a project manager must negotiate within the dimension of problem resolution by utilising skills of reasoning, persuasion and suggesting alternatives.

Manage people and changes during a project: According to the ICB (2006), the PMCDF (2007) and Gareis (2018), managing changes means to identify changes caused by the project and their impact and to communicate them to stakeholders appropriately. The ESPM3 (2007) emphasises on dealing with the resistance of people. The cultural dimension of “*Uncertainty Avoidance*” must to be taken into account, as the extent to which low risk-taking and emotional resistance to change is preferred. Changes need to be communicated transparently, and people’s concerns and fears must be considered. Also, the most recent version of the ICB (2015) adds this dimension by considering cultures, and values systems depending on the caused disruption. The reason behind this is that behavioural changes caused by projects must be managed so that those changes are applied by the people.

4.2.3 Self-Competences

Cultural awareness and acknowledging of cultural diversity: Gareis (2004) started to acknowledge that international projects require cultural awareness and language knowledge. The ICB (2006) considers cultural awareness within the dimensions of ethics, teamwork, openness, and project organisation. Also, the dimension of professionalism within the PMCDF (2007) requires managing a diverse workforce. Self-competences referenced are the development of trust in order to ensure adherence to cultural issues and ethical values, as well as respecting personal, ethnic, and cultural differences. The ESPM3 (2007) emphasises on culture, as Mauritius counts as a multi-cultural society. Hence, project managers need to be able to motivate people with different cultural backgrounds. The APMBOK (2012) includes cultural awareness in its dimension of influencing and teamwork. The alignment between the PMCDF and the most recent version of the OPM3 (2013) led to the inclusion of education in the awareness of cultural diversity with the aim to enable staff to work in a multi-cultural environment. It must be pointed out that the OCB (2014) stresses that people working in projects will develop temporary project-cultures. They then need to acknowledge different cultures inside and outside the organisation, which will lead to better cooperation. When looking at its most recent version, the ICB (2015) develops an individual dimension named Culture and Values that contains the necessary ability to acknowledge and respect different cultures internally and externally. Further, the ICB suggests different supporting methods, like published researches, the use of codes of conduct, or lessons learnt in order to improve the cultural alignment in future projects. Due to the frequent presence of multicultural environments in construction projects, the CCS-PMMM (2020) states that the impact of culture needs to be considered in general.

The ability to self-reflection: The ICB (2006) started to include self-control as the ability to approach and deal with daily work, changing requirements and stressful situations. This concept was adopted in the PMCDF (2007), which requires the ability to maintain self-control in all situations by utilising techniques like stress management. The goal is to manage own emotions and to respond calmly. In 2012 the APMBOK further developed this dimension with the ability to assess and understand own patterns of attitude, behaviour, emotion and decision-making. These patterns are complex constructs based on own experiences, culture, or emotional states. This relates to communication skills, leadership,

and cultural awareness. This is like the most recent version of the ICB (2015) that complements the dimension of self-control with the ability of self-reflection and self-management. Self-understanding enables the understanding of one's own emotions, preferences and ethical values which is necessary to reduce bias. A very similar development can be observed when looking into the most recent version of the PMCDF (2017) that also adds self-reflection on the appropriateness and effectiveness of actions (through surveys or observations) to understand causes of mistakes and failures. Also, Gareis (2018) added a dimension of self-understanding in order to recognise own personal emotions and values (ethics). This is combined with self-control, and to be open and able to cooperate with others. Further, the CCS-PMMM (2020) stresses that the reflection of team members' unique perspective, experience and competence has a positive impact on project success (cf. Pasian 2011, p. 198).

The ability to understand interests of individuals and groups: The ICB (2006) started to include a dimension "*Values Appreciation*" as the ability to understand intrinsic qualities of other people and their point of view. This includes acknowledging (respect and appreciate) other opinions, values, and ethical standards of different parties influencing the project. Hereby, building mutual respect is the basis. The PMCDF (2007) adopts this concept within the ability to influence that covers strong negotiation skills and using positional power of others as well as knowledge from third parties in order to persuade others. The "*Soft Skills*" dimension of the ESPM3 (2007) requires the appreciation of skills between team members, and acceptance of individual preferences. These abilities were further developed by the APMBOK (2012) that complements the ability of self-understanding with the understanding of the feelings of others (emotional intelligence). In the ICB (2015) a completely new dimension named Power and Interest was added. This dimension deals with recognising and understanding of informal interests of individuals and groups including the resulting politics and the use of power. An individual must be aware of the informal and, for the most part, implicit knowledge about culture and values.

Competence in working with digital collaboration tools: The use of technology is crucial for virtual teamwork. Those could be communication tools (e.g. video conferencing) or digital collaboration tools (e.g. Microsoft Teams), also called "groupware". Those tools are the main driver of increased use of virtual teams in organisations (cf. Bergiel; Bergiel; Balsmeier 2008, p. 103). The ESPM3 (2007) considers building competence to deal with new technology, like communication infrastructure. Also, the PMCDF (2007) considers that PM tools and methods to communicate effectively need to be understood and used appropriately. This also counts for knowledge management tools, to log and resolve project issues effectively. The ICB (2015) and Gareis (2018) are the only frameworks that take the ability to communicate virtually into account. Here, the ICB (2015) complements its dimension "*Personal Communication*" with the ability to communicate effectively with virtual teams that requires to consider aspects such as language and time zones. Within the teamwork dimension of the ICB also the ability to use collaboration tools is considered.

Ethical behaviour: Kerzner (2001) started to incorporate training on moral and ethics into the level 3 questionnaire. Also, the ICB (2006) state that ethics should be respected to allow people to act without moral conflict. The project manager needs to ensure that certain ethics are fully complied with and be aware that social and cultural differences can also reveal differences in ethics. Core values of respect, responsibility, fairness and honesty as ethical

principles (PMI Code of Ethics – see section 3.4.1) when doing projects were included the PMCDF (2007). The PMI further states that ethical choices lead to positive outcomes such as reduction of risks, the increase of trust and reputation. The APMBOK (2012) adds the appropriate skill to follow an appropriate code of ethical conduct into the dimension of professionalism. Finally, Gareis (2018) fully adopts the Code of Ethics from the PMCDF.

Language skills: This dimension is covered partly by Gareis (2004), the APMBOK (2012) and the KPMMM (2019), which acknowledge the lack of a common language as one possible barrier. Gareis (2004) emphasises on language knowledge as a prerequisite when doing projects internationally. The ESPM3 (2007) covers the situation that communication in South Africa is frequently not based on a person's first language within the dimension of environmental management. The dimension of Personal Communication within the ICB (2015) requires considering language as an influential factor to communicate effectively in virtual teams that are geographically dispersed.

4.3 Comparison of Model Application and Complexity

The assessment considers geographic dispersion: The KPMMM (2001) uses strategic planning that requires to understand the demographic environment within and outside the organisation. This contains the understanding of the geographic dispersion of the organisation that leads to questions like “*How do we get everyone to support the methodology?*” and “*Will there exist language/communication complexities?*” (cf. Kerzner 2001, p. 26). Those questions need to be answered prior to the assessment. The OMP3 adopted this concept in their most recent version (2013) that also requires the assessment to be adapted to different national cultures.

Model complexity: This dimension is derived from maturity models developed in emerging markets. Sukhoo places a special standing on simplicity and ease of understanding the model (cf Sukhoo et al. 2007, p. 101). The complexity dimension was estimated based on the assessment requirements and extent. Classifications provided by Torres (cf. Torres 2014, p. 83–84) and the evaluated details (amount of considered factors) by Khoshgoftar (cf. Khoshgoftar; Osman 2009, p. 299) served as orientation. The OPM3 complexity was classified high because of the large number of best practices and capabilities. The IPMA Delta was classified with high complexity due to the number of standards used. Due to the low number of questions per level, the Prado-PMMM was classified as low regarding complexity. Gareis and the KPMMM are classified with medium complexity, as they are located within the boundaries of those two levels of complexity.

4.4 Presentation of Comparison Results

The comparison resulted in the following three tables that show the comparisons on organisational (Table 6), the individual and the team (Table 7) view on the model application and complexity (Table 8). The comparisons are based on the dimensions identified in the qualitative analysis outlined in the previous sections 4.1, 4.2 and 4.3. It has to be pointed out that these comparisons and the results are both subjective interpretations of the author. Therefore, also the measures used in the presentations below are based on subjective

assessments of the author. The results are presented in the following tables. Those utilise characters of + and - as indicators if and to which extent each dimension is covered by the model. Hereby, the following denotation is used:

- Is not covered by the model.
- + Is only partly covered by the model (e.g. mentioned without further description).
- ++ Is covered by the model with detailed description or references.
- +++ Is covered by the model and is related to awareness of different cultures or values.
- () A second row is provided to indicate if this dimension was further developed compared to a prior version or edition of the model.

The indication used for “*Model complexity*” is different from the others. It shows - for higher complexity and + for lower complexity.

Table 6 Comparison on Organisational Level

Source: Own creation

Model	Kerzner PMMM	Prado PMMM	OPM3	Gareis PMMM	P3M3	IPMA OCB (as part of Delta)
Publishing year of different versions	2001 (2019)	2006 (2014)	2003 (2013)	2004 (2018)	2008 (2015)	2014 (2016)
4.1.1) Organisational commitment on development of PM capabilities and the organisational structure						
<i>The commitment of upper management on the development of organisational project management</i>	++	++	++	++	++	++
<i>Alignment of project management with the organisational structure and strategy</i>	+	++	+ (++)	++	++	++
<i>Supportive organisational structures in place</i>	+	++	++	++	++	++
<i>IT support</i>	+	+	+ (++)	+	+ (++)	+ (++)
4.1.2) Organisational culture						
<i>Alignment of the organisational culture with project management</i>	++	-	- (++)	++	- (++)	+++

Model	Kerzner PMMM	Prado PMMM	OPM3	Gareis PMMM	P3M3	IPMA OCB (as part of Delta)
Publishing year of different versions	2001 (2019)	2006 (2014)	2003 (2013)	2004 (2018)	2008 (2015)	2014 (2016)
<i>The organisational culture fosters teamwork and community values like cooperation and trust</i>	++	+	++	- (++)	-	+++
4.1.3) Organisational learning for project management						
<i>Introduction of knowledge management through lessons learned</i>	++	++	++	+	++	++
<i>Introduction of a common documentation language</i>	+	+	+	+	+	+
<i>Introduction of project management development programs / career paths.</i>	++	++	++	++	++	++
<i>Introduction of communities of practice</i>	- (++)	-	-	++	- (++)	++
<i>Acknowledges that competency development may vary depending on country and culture</i>	-	-	- (+++)	-	-	-

Table 7 Comparison on Individual Competence Level

Source: Own creation

Model	KPMMM ³⁵	Prado PMMM ³⁶	PMCDF (as part of OPM3)	Gareis PMMM	APMBOK (as part of P3M3)	IPMA ICB (as part of Delta)	ESPM3	CCS PMMM
Publishing year of different versions	2001 (2019)	2004 (2014)	2007 (2017)	2004 (2018)	2008 (2012)	2006 (2015)	2007	2020
4.2.1) Leadership competences for project managers								
<i>Project leaders can adopt an appropriate leadership style, can identify and make use of power</i>	+ (++)	+	+++	+	- (++)	+ (+++)	+++	+++
<i>Project leaders can disseminate the organisational culture into the project culture</i>	-	-	- (+++)	- (+++)	-	- (+++)	+++	+++
<i>Team composition, building and development</i>	-	-	+ (++)	- (+++)	- (+++)	+++	+++	+++
4.2.2) Social competence of project managers and teams								
<i>Teamwork, cooperation and creation of trust</i>	-	-	+++	- (+++)	- (+++)	+++	+++	+++
<i>Relationship building</i>	-	+	+++	+ (++)	- (+++)	+++	+++	+++
<i>Communication management</i>	++	+	+++	+ (++)	+ (+++)	++ (+++)	++	+++
<i>Conflict management</i>	+	+	+++	+	- (++)	++ (+++)	++	+
<i>Negotiation skills</i>	-	+	++	- (++)	- (++)	++ (+++)	++	+
<i>Manage people and change during a project.</i>	-	+	++	- (++)	+	++ (+++)	+++	-

³⁵ References to PMI standards, but without further specification.³⁶ References to PMI and IPMA standards, but without further specification.

Model	KPMMM³⁵	Prado PMMM³⁶	PMCDF (as part of OPM3)	Gareis PMMM	APMBOK (as part of P3M3)	IPMA ICB (as part of Delta)	ESPM3	CCS PMMM
Publishing year of different versions	2001 (2019)	2004 (2014)	2007 (2017)	2004 (2018)	2008 (2012)	2006 (2015)	2007	2020
4.2.3) Self-competence for project managers and teams								
<i>Cultural awareness and acknowledging of cultural diversity</i>	-	-	+++	+++	- (+++)	+++	+++	+++
<i>The ability of self-reflection</i>	-	-	+ (++)	- (+++)	- (+++)	+ (+++)	-	+++
<i>The ability to understand interests of individuals and groups.</i>	-	-	+	-	- (+++)	- (+++)	+++	-
<i>Ethical behaviour</i>	+	-	++	- (++)	- (++)	+++	-	-
<i>Competence in working with digital collaboration tools</i>	-	-	+ (++)	- (++)	-	-	++	- (++)
<i>Language skills</i>	- (+)	-	-	+	- (+)	- (+)	+++	-

Table 8 Comparison on Model Application and Complexity

Source: Own creation

Model	KPMMM	Prado PMMM	PMCDF (as part of OPM3)	Gareis PMMM	APMBOK (as part of P3M3)	IPMA ICB (as part of Delta)
Publishing year of different versions	2001 (2019)	2004 (2014)	2007 (2017)	2004 (2018)	2008 (2012)	2006 (2015)
<i>The assessment considers geographic dispersion</i>	+++	-	- (+++)	-	-	-
<i>Model complexity</i>	+	++	-	+	+ (-)	-

5. Discussion

This chapter is guided by the research questions and sub-questions defined in section 1.3. The first step consists of synthesising the comparison results from chapter 4 on the organisational and individual level. In a second step, these outcomes are further synthesised with applied research on maturity assessments (e.g. sections 3.3.4, 3.4.4, 3.5.4, and so on). This leads to implications that address the research questions directly. The first section (5.1) points out how challenges of complex, intercultural PM are considered and have developed (main question and first sub-question). The second section (5.2) deals with topics and implications related to differences from a country of origin perspective (second sub-question). By doing so, this thesis is attempting to gather fresh insights into the strengths and weaknesses of analysed OPMMs in order to lay a foundation for the future development and assessments.

5.1 Cultural Considerations and Development

In terms of the development, a clear trend towards harmonisation across the main models can be recognised. There is a tendency to move from a purely organisational focus to holistic approaches. Organisational commitment, strategical and structural (process) alignment might lead to stability that enables an organisation to cope with change (cf. Lenfle; Loch 2010, p. 50–51; cf. Torres 2014, p. 139–142). However, the roles of the corporate culture, as well as organisational learning are increasingly perceived as being more important factors for OPMM development.

5.1.1 Alignment of Corporate Culture and Values

When looking into each model, a clear positioning exists when it comes to the alignment of the corporate with the project management culture. There is a mutual agreement in the literature that this alignment acts as enabling factor for maturity development (cf. Belzer 2001, p. 2; cf. T. L. Doolen; M. E. Hacker; E. M. Van Aken 2003, p. 286; cf. Cooke-Davies 2004, p. 1251; cf. Mohammed; Prabhakar; White 2008, p. 4). This is in line with Kerzner, who even states that organisational restructuring to integrate project management is unnecessary if the corporate culture strongly supports project management (cf. Kerzner 2001, p. 136). Mutual agreement exists that it is the role of the top management to maintain a project friendly organisational culture. The different models realise this cultural alignment by incorporating values related to PM into the organisational culture. Those are mutual trust, horizontal communication and cooperation (cf. Kerzner 2001, p. 89; cf. Gareis; Gareis-Halpin; Gareis 2018, p. 465). Further, this includes to foster standards like ethical principles (honesty, responsibility, respect and fairness) and a code of conduct (cf. PMI 2007, p. 37–38; cf. Wagner 2014, p. 55–56).

Further, different models emphasise the importance of the alignment between corporate culture and project culture (cf. Sedlmayer et al. 2015, p. 64; cf. PMI 2017b, p. 106; cf. Gareis; Gareis-Halpin; Gareis 2018, p. 155; cf. Li et al. 2020, p. 11). This is consistent with the necessary ability of a project manager to disseminate organisational values into the

project management culture. In terms of development, this ability is receiving attention across all models. Finally, the most recent version of the IPMA OCB started to extend the alignment to external cultures on country and subsidiary levels. However, the OCB does not state how those cultures should be aligned.

The importance of cultural alignment between the organisation and project management is also reflected in assessments conducted. Different authors highlight their importance and positive influence on project management. It is perceived as a means to increase maturity (cf. Silva et al. 2019, p. 6). Therefore, the authors state that basic values that support project management need to be incorporated (cf. Katane; Dube 2017, p. 5–6; cf. Vasili Osmakov et al. 2019, p. 14; cf. Kerzner 2019, p. 257). This enables a team to create an own temporal project culture aligned with the company that actively supports teamwork (cf. Gareis; Gareis-Halpin; Gareis 2018, p. 155). In contrast, participants of reviewed assessments with process focus gave active feedback on missing softer aspects like culture (cf. Backlund Fredrik; Chronéer Diana; Sundqvist Erik 2015, p. 12).

5.1.2 Organisational Learning as Enabler for Maturity Development

Ways of maturity development are organisational and personal learning. Organisational learning gets increasingly highlighted as important means for competence development. On the one hand, complete PM career paths are required, and on the other hand, knowledge management and sharing of experience are proposed. All models highlight the importance of competences development of project management staff - with emphasis on the development of career paths and a curriculum dedicated to project management. Models start to emphasise that the organisational culture must acknowledge that competences development is perceived to have added value and brings the organisation forward. However, yet only the PMCDF (2017) started to acknowledge that training programmes need to be tailored depending on country and culture (cf. PMI 2017b, p. 55). Proposed means of knowledge sharing and collective learning on a global level is the implementation of communities of practice. That lessons learnt need to be shared across the company have become standard practices. This trend led to organisational learning through regular events on a global level which is mentioned since 2015 (cf. Murray; Sowden 2015, p. 49; cf. Sedlmayer et al. 2015, p. 19; cf. Gareis; Gareis-Halpin; Gareis 2018, p. 467). A beneficial consequence is that synergies can be identified that can become an enabler for relationship building (cf. Gareis 2004, p. 138).

This is supported by different assessment results, which concluded that the company needs to improve knowledge management through lessons-learnt and commit on project management training efforts (cf. Neves et al. 2013, p. 465; cf. Silva et al. 2014, p. 1035; cf. Laíce de Souza Scotelano et al. 2017, p. 506). Additionally, PM training for employees was recognised as most important mean for improving maturity (cf. Supic 2005, p. 651; cf. Füssinger 2006, p. 4; cf. Vasili Osmakov et al. 2019, p. 14). Which was found notably missing in the feedback section of some of the assessments (cf. Silva et al. 2019, p. 8; cf. Backlund Fredrik; Chronéer Diana; Sundqvist Erik 2015, p. 14).

The importance of the learning organisation was also highlighted in the PMMM comparison conducted by Iqbal: While maturity models provide the means for understanding the status

around project management maturity and probably certain steps for development, the organisation can only develop maturity through learning (cf. Iqbal 2013, p. 21).

Linking back to Figure 10 in chapter 4, organisational learning further acts as a connector between the organisational and individual project management competence development. Competence development must be initiated and supported by the organisation. These development programs should then encourage individuals and supervisors to find gaps and in competences (knowledge, skills) required by individuals and teams (cf. APM 2012, p. 88).

5.1.3 From Practice towards Leadership, Social and Self-Competences

When it comes to education and development programmes, social competences of individuals and teams are perceived as enablers for PM. Models started to reference and even to incorporate individual competency development frameworks into the assessment. Also, there are quite some similarities between these frameworks. The comparison presented in Table 7 (section 4.4) shows that an overall development over time led to the integration of factors required in transnational teams. Here, social competencies (see section 1.1.1) of individuals such as leadership, teamwork, communication, relationship building, conflict management, negotiation and change management were identified to be important - from OPMMM point of view - when managing project across cultures. When it comes to leadership, models identified different leadership styles that a project manager needs to understand and to be able to apply appropriately.

By incorporating individual competencies development frameworks OPMMMs, social competences were complemented with personal self-competences. Identified self-competencies relate to all social competencies mentioned in the previous section. The following competencies became progressively more important: Acknowledging and understanding of culture, ethics (see section 4.2.3), values and behaviours of one's own and others. Influencing the project environment is receiving a lot of attention. It is comprised of different abilities to manage a diverse workforce that requires teamwork based on cooperation and trust, and remote/virtual teamworking (see 5.1.4). This includes emotions, behaviours and values. OPMMMs require cultural diversity training to enable staff to work in multi-cultural environments. Creation of trust to ensure adherence to cultural and ethical values plays an important part.

However, only one assessment among all papers identified conducted a detailed investigation on social, as well as self-competencies of project management staff. Ten so-called behavioural competencies were assessed (see section 3.7.4). Bushuyeva et. al. identified a lack in teamwork and negotiation competencies that attributed negatively on the success of the project (cf. Bushuyeva et al. 2018, p. 227).

While OPMMMs already started to incorporate social competences, the area of self-competences appears to be an emerging area. This might also be the reason for the lack of assessed self-competences. Henceforth, this leads to a major implication that points to the need of incorporating them into future assessments.

5.1.4 Virtual Teamwork and Language as Emerging Dimensions

All models propose to implement software tools to support PP&P management. This was also considered by maturity assessments (cf. Neves et al. 2013, p. 465; cf. Fraticelli; Archibald; Prado 2014, p. 4; cf. Katane; Dube 2017, p. 5). The focus lies in supporting the project management processes like time, budget or task management. Here, only the OPM3 underlines their positive influence for organisational learning like the reuse of best practices or knowledge sharing. As for individual competencies, the models started to incorporate infrastructure skills in order to effectively use new communication and collaboration tools. Different use-cases emerged and, besides communication and collaboration, also knowledge management tools need to be utilised to log and resolve issues during a project.

Since 2015, competence frameworks complement the dimension of communication with the ability to communicate virtually. This potentially shows that models acknowledge transnational PM as these typically involve locally dispersed team members with different languages and time zones. Hence models are yet shallow on aspects such as IT systems support and digital competences, the introduction of a common documentation language, as well as adaptation of the assessment towards country and culture. Publications from different scholars indicate that competence implementing and working with IT systems (e.g. collaboration and communication tools) is essential to enable virtual teamwork (cf. Bergiel; Bergiel; Balsmeier 2008, p. 103; cf. Zuofa Tarila 2017, p. 236).

So far, the comparison shows that this topic seems underrated and needs to receive more attention in the future. The same applies to language issues, which are recognised as communication barriers. However, besides a common PM terminology, there is little emphasis on the topic of language. Here, only the ESPM3 deals with communication among people using a language not being their mother tongue. Other models merely touch upon this aspect when referring to language barriers without possible measures or competences to cope with it. Nevertheless, the development shows that by recognising teamwork in locally dispersed and virtual settings, the emphasis on language might rise.

5.2 Differences from Country Perspective

As stated before, there is a general trend of harmonisation between the main models and their dimensions. However, at the same time, this is also the reason why specifically different models were created in emerging markets (e.g. Africa, China and Brazil). Hence, differences in country of origin can be identified.

5.2.1 Cultural Proximity as Selection Criterion

Sukhoo bases the reason for the development of the ESPM3 also on research results from Muriithi and Crawford that revealed that general concepts in project management cannot be applied universally due to cultural differences. As existing practices are not valid in some cultures, it can lead to rejection or failure (cf. Stuckenbruck; Zomorrodian 1987, p. 170; cf. Muriithi; Crawford 2003, p. 318). Models that are built to be utilised on a global level seem

to acknowledge this situation. For example, the KPMMM or the OPM3 (both from the USA) require an environmental analysis in order to adapt or customise dimensions for the assessment (cf. PMI 2017b, p. 55; cf. Kerzner 2019, p. 175–176).

The author observed that different practitioners used cultural proximity as the main selection criterion for using a specific model. Criteria include country of origin, geographical distance or similarities in values. This was especially the case for the Prado-PMMM that is commonly applied in Brazil. Scholars who applied OPMMMs refer to cultural proximity, however they do not describe where these proximities are embedded within the model (cf. Neves et al. 2013, p. 463; cf. Laíce de Souza Scotelano et al. 2017, p. 504).

The author deduces that this result may be influenced by cultural boundaries. As highlighted by Guangshe (cf. Guangshe et al. 2008, p. 61) there is a possibility of incompatibility as far as the recommended best practices from the models are not applicable in a given region. In the particular case of the OPM3 assessment in China, leadership competences are preconised by OPM3 may not apply due to cultural contingency. The same might be true for values like horizontal communication when networking between projects (cf. Kerzner 2001, p. 89; cf. Gareis; Gareis-Halpin; Gareis 2018, p. 465). Hence, specific cultural values might be harder to establish in a government institution in China, where supervisors are viewed as absolute authorities (cf. Guangshe et al. 2008, p. 61). This is evidence by the GLOBE findings (cf. House et al. 2004, p. foreword XVII). Linking back to 5.1.3, these findings also suggest that the selection of appropriate leadership styles needs to be culturally adapted.

Therefore, the observed harmonisation is self-defeating for main models which claim to be applicable across cultural boundaries. This outcome is closely related to the model complexity as a barrier for the model application, which is outlined in the next section.

5.2.2 Model Complexity as Barrier for the Model Application

A substantial finding when comparing models based on country of origin is the domain of model complexity. Model complexity refers to the overall content of the model and the number of best practices and frameworks that are included. Here, models from emerging markets, like the Prado-PMMM and the ESPM3 put a lot of effort into the simplicity of the model and the convenience for its application. Sukhoo bases this decision on different national issues in developing countries (e.g. lack of training, lack of skilled labour, lack of PM skills) that require the model to be simplified in order to be functional, practical and successful.

This is also backed up by different researchers, who observed that problems in understanding the model led to barriers for its application (cf. Guangshe et al. 2008, p. 61; cf. Backlund; Chronéer; Sundqvist 2014, p. 12–15; cf. Narbaev 2015, p. 16). Further, this argument can be supported by research findings. Different authors found that the assessment tools could only be used to a certain extent, as PM knowledge and practices in companies they assessed were on a low level (cf. Bay; Skitmore 2006, p. 6; cf. Narbaev 2015, p. 12). And finally, one of the main factors why scholars decided to use the Prado-PMMM was the ease of use (or simplicity) and practical way of obtaining results (cf. Neves

et al. 2013, p. 460; cf. Fraticelli; Archibald; Prado 2014, p. 17; cf. Laíce de Souza Scotelano et al. 2017, p. 504).

While a broad scope (e.g. number of best practices and dimensions) could be necessary to cope with environmental complexity, it could also be a reason for discouraging potential users. For example, with more than 3000 capabilities and 600 practices included in the OPM3, it is hard to find the right ones to reach success (cf. Hillson 2003, p. 300). To cope with this issue, it appears that OPMMMs allow adapting the dimensions or best practices used for the assessment. This adaption might also lead to flexibility (cf. Farrokh; Azhar 2013, p. 62). Kerzner stresses that this decision should start with the vision of senior management on how to run the company. For example, the KPMMM can be used in stages (see section 3.2.2), and so, companies for example only assess on level 2 (cf. Bay; Skitmore 2006; cf. Ofori; Deffor 2013; cf. Berssaneti; Carvalho 2015). Other examples are the OPM3 that allows selecting best practices (see 3.4), the most recent version of the P3M3 that became customisable or the IPMA-Delta that is split into three different models that can be used independently. Also, the IPMA defines their frameworks as being generic and the user needs to decide on how to tailor them to be applicable in a specific organisation (cf. Wagner 2014, p. 11). This is in line with research results retrieved by Mullaly (cf. Mullaly Mark 2014, p. 181). Linking back to the models, a stimulating finding is that the dimensions addressed in the IPMA ICB were significantly reduced. This might be one first step towards simplification (found in section 3.7.3).

6. Conclusion and Implications

This thesis began with the premise that project management is becoming increasingly international, eventually leading to its trans-nationalisation. Additionally, training programmes are being created based on the outcomes of maturity assessments (OPMMMs). Therefore, the objective was to analyse the main OPMMMs on the market in terms of dimension, which have a positive impact on the results of transnational PM³⁷. To gain a comprehensive view, the purpose of the model selection was to gather models from different countries of origin. Hence, the findings conveyed, contribute to existing research by pointing out how OPMMMs consider dimensions like culture, language or geographic dispersion. Based on the reviewed extant literature in the frame of the present research, the author concludes that this is the first study that has examined OPMMMs from this perspective.

The literature on this topic discussed in chapter 5 reinforces that challenges towards transnational PM are being addressed by the main OPMMMs on the market. Moreover, it can be said that this domain received increasingly more attention since the beginning of the 21st century. Based on the research result (section 4.4), it appears that the area of internationalisation might be one of the main drivers for future OPMMM development. An accompanying harmonisation of the dimensions of the main OPMMMs supports the hypothesis of trans-nationalisation.

According to the data based on OPMMM framework definition and applied research, there is a focus on the organisational culture as enabling factor for improving project management. This requires incorporating project-oriented values and ethical principles (see 5.1.1) into the organisational culture. This is in line with the required ability of project managers to disseminate those values into the project culture. Organisational learning is the key driver of maturity development. The key abilities required by OPMMMs that deal with international projects are incorporated in the area of self-competences. Competencies that are required include cultural awareness, self-reflection and ethical behaviour. The development over time shows that this area received the most attention over the past twenty years. However, aspects around language and the emerging topic of competencies related to working in virtual teams are not yet satisfactorily and sufficiently worked out in prime condition and need to be developed further.

The downside of these developments is that models increasingly grow as they incorporate additional dimensions. This, in turn, leads to complex constructs. The consequence for starting an organisational maturity assessment might be that companies need to seek external support. Therefore, company executives in multinational enterprises (MNEs) who want to improve PM must be aware of these issues. Moreover, PMMM assessors need to address the aspects outlined in the discussion in order to give professional advice.

Applied research shows that model complexity leads to barriers for the application of the model. At the same time, a barrier for the application seemed to be cultural differences as values differ from country and region. Hence, this was the main driver that led to simplified and adapted OPMMM structures as they seem to be especially true for certain developing

³⁷ See Appendix B9.

countries (ESPM3, Prado-PMMM). The author found that main OPMMMs miss to address cultural differences when suggesting corporate values as an enabler for PM or within the definitions of leadership styles. Consequently, major models need to be simplified and/or easily adaptable to different country/culture combinations. At this point, only one framework acknowledged that cultural sensitivities should be understood and to adapt accordingly.

And finally, research results of the major part of papers collected focus on organisational dimensions. Even though the corporate culture as an enabler for PM seems to be underestimated still, practitioners increasingly acknowledge its role. This is not yet the case for individual dimensions which have received very modest attention since recently.

7. Limitations and Further Research

Although the study was conducted via a thoroughly integrated and structured literature review, there were certain limitations while exploring the aim of the study. The author concentrated on the limitations that had the greatest potential impact on the quality of the research findings and the ability to effectively answer the research questions. The limitations found are time and the absence of practical insights, the author's competence in foreign languages and limited financial budget. It is expected that compensating these limitations will help future researchers to avoid the same shortcomings.

The limitation on time can be split into four different aspects. Firstly, the limitation on time led to a careful selection of a small number of OPMMMs for the comparison. Even though these are the main models on the market, additional models (e.g. including models from different consultancies into the process) might lead to a more extensive view of this topic. Secondly, limitation on time excluded practical insights. The author sees this as limiting, as the frameworks analysed often provide superficial definitions. This is equally true for research papers that convey their results but with only limited insights into the detailed assessments. A planned case-study aiming to include practical insights to this study had to be excluded due to the COVID19 pandemic in spring 2020. Summed up, as secondary sources on frameworks and assessments frequently focus on high-level organisational results, primary insights might complement the basis for interpretations. This might also lead to a better understanding of too general statements and definitions of dimensions within OPMMMs. Thirdly, the limitation on time led to a specific time frame for the structured literature collection. Hence, new publications published after March 2020 couldn't be included. Fourthly, the research results are based on the subjective comparisons and ratings of the author. This subjectivity is given because it was not possible to include further judges into a peer-review process. Therefore, there is no inter-rater reliability, as it is still necessary to conduct a peer review process to validate the research results.

Limited language competence of the author led to a literature collection limited to English and German language. By including more languages, a more sophisticated conclusion based on cultural influences could be developed. For example, the most recent version of the Prado-PMMM was not yet translated into English, and most of the research from China was only available in the local language.

Finally, a limited budget led to the exclusion of non-accessible research papers as well as older editions of OPMMM frameworks selected.

By acknowledging the limitations outlined above, the author would like to propose an outlook for future research. The following list summarises three research lines that should be explored:

- Frameworks as well as research that was analysed and compared only offer rough descriptions of certain dimensions. Therefore, findings that are outlined in chapter 5 should be verified through interviews with experts and practitioners, as well as case-studies conducted in different MNEs: Which role do behavioural (social and self-) competencies have during practical assessments? Are PM education programmes built

on competences proposed by the models? What is the proportion between organisational and individual competence development?

- An assessment should be conducted on how cultural adaptation in terms of OPMMM could look like: How must an OPMMM be tailored to fit into certain national cultures? What are the reasons for the acceptance of the Prado-PMMM in Brazil? And why is it also finding acceptance in Southern Europe (Italy, Spain, Portugal)? Based on the results of this evaluation on cultural adaptation, specific criteria for the model selection and / or customisation could be evaluated.
- Some of the papers around applied assessments of different companies identified barriers for applying certain OPMMMs. Others identified missing project management knowledge and practices in certain countries. Therefore, the author proposes to identify reasons that may be attributed to the underperformance of assessments in certain countries like China, Malaysia or Indonesia: What are the real barriers for application? What are the reasons that can be allocated to cultural differences and language?

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Appendix A: Coding Book

Table 9 Coding Book
Source: Own creation

#	Authors / Organisation	Nationality of the authors	Journal / Conference	Name	Area of research	Year of creation	Model	Source	Keywords / Different search method	Hits	Citations on Google Scholar	Country of Origin (Paper)
1	Kerzner	USA	Wiley	Strategic planning for project management using a project management maturity model	General	2001	KPMMM	OLAV (FHV online library)	"project management maturity" & Kerzner	3230	1047	USA
2	Kerzner	USA	Wiley	Using the Project Management Maturity Model	General	2005	KPMMM	OLAV (FHV online library)	"project management maturity" & Kerzner (book was available in the universities library)	3230	240	USA
3	Archibald; Prado	Brazil, Italy	PM World Journal	Foundations of the Prado-PM Maturity Model	General	2002	Prado	pmworldlibary.net	"project management maturity" & Prado	598	4	Brazil
4	Prado	Brazil	-	MMGP MATURITY EVALUATION QUESTIONNAIRE Version 1.4	-	2006	Prado	pmworldlibary.net	Retrieved based on research on the Prado-PMMM.	n.A.	n.A.	Brazil
5	Prado	Brazil	-	Questionnaire Departmental Maturity Evaluation: Prado-PMMM (Maturity Model) Version 2.2	-	2014	Prado	pmworldlibary.net	Retrieved based on research on the Prado-PMMM.	n.A.	n.A.	Brazil
6	PMI	USA	Project Management Institute	Organizational Project Management Maturity Model (OPM3)	General	2003	OPM3	Google Scholar	"project management maturity" & OPM3	3080	10	USA
8	PMI	USA	Project Management Institute	Project Management Competency Development Framework Second Edition	General	2007	OPM3	PMI website (pmi.org)	Retrieved during search for the most recent version.	n.A.	n.A.	USA
7	PMI	USA	Project Management Institute	Organizational Project Management Maturity Model (OPM3)	General	2013	OPM3	OLAV (FHV online library)	Retrieved based on references in the most recent version.	n.A.	n.A.	USA
9	PMI	USA	Project Management Institute	Project Management Competency Development Framework Third Edition	General	2017	OPM3	PMI website (pmi.org)	Retrieved based on references in the most recent version	n.A.	n.A.	USA
10	Gareis	Austria, Austria	The Wiley Guide to Managing Projects	Management of the project-oriented company	General	2004	Gareis	Google Scholar	"project management maturity" & Gareis	426	92	Austria
11	Gareis	Austria	CRC Press	Project. Program. Change.	General	2018	Gareis	OLAV (FHV online library)	Retrieved based on references in the most recent version	n.A.	n.A.	Austria
12	OGC (Sowden)	United Kingdom	Office Government and Commerce	Portfolio, Programme and Project Management Maturity Model	General	2006	P3M3	Google Scholar	"project management maturity" & P3M3	888	5	United Kingdom
13	Axelos (Murray; Sowden)	United Kingdom	Axelos	Introduction to P3M3®	General	2015	P3M3	Axelos website (axelos.com)	Retrieved based on research on the P3M3.	n.A.	n.A.	United Kingdom
14	APM	United Kingdom	APM	APM body of knowledge	General	2012	P3M3	APM website (apm.org.uk)	Retrieved based on references in the most recent version	n.A.	n.A.	United Kingdom
15	IPMA	Europe (Switzerland, Australia, Germany, Russia, Croatia, Netherlands, Denmark, Portugal), USA	GMP-IPMA.de	Individual Competence Baseline for Project Management Version 3.0	General	2006	IPMA	GPM Website (gpm-ipma.de)	Retrieved based on references in the most recent version	n.A.	n.A.	Switzerland
16	IPMA	Europe (Switzerland, Australia, Germany, Russia, Croatia, Netherlands, Denmark, Portugal) + USA	IPMA.world	Individual Competence Baseline for Project Management Version 4.0	General	2015	IPMA	IPMA website (ipma.org)	Retrieved based on references in the most recent version	n.A.	n.A.	Switzerland
17	IPMA	Europe (Germany, Croatia, Russia, Switzerland, United Kingdom, Netherlands), China	IPMA.world	Organisational Competence Baseline for Developing Competence in Managing Projects Version 1.0	General	2014	IPMA	IPMA website (ipma.org)	Retrieved based on references in the most recent version	n.A.	n.A.	Switzerland
18	IPMA	Europe	IPMA.world	Organisational Competence Baseline for Developing Competence in Managing Projects Version 1.1	General	2016	IPMA	IPMA website (ipma.org)	Retrieved based on references in the most recent version	359	4	Switzerland
19	Sukhoo	Mauritius	Interdisciplinary Journal of Information, Knowledge, and Management	An Evolutionary Software Project Management Maturity Model for Mauritius	Software development	2007	ESPM3	Google Scholar	"project management maturity"	8950	25	Mauritius
20	Li et. al.	China	Springer.com	Project management maturity in construction consulting services: Case of Expo in China	Construction	2020	CCS PMMM	Google Scholar	Literature was retrieved based on references in studies found.	n.A.	n.A.	China
21	Pasian	Netherlands	International Journal of Managing Projects in Business	Project management maturity a critical analysis of existing and emergent contributing factors	E-Learning	2011	E-learning PMMM	Google Scholar	Literature was retrieved based on references in studies found.	No explicit search criteria.	20	Netherlands
22	Neves	Brazil	Journal of Aerospace Technology and Management	Application of the Prado - Project Management Maturity Model at a R&D Institution of the Brazilian Federal Government	R&D Institution of the Brazilian Federal Government	2013	Prado	Google Scholar	"project management maturity" & Prado	614	2	Brazil
23	Fraticeili; Archibald; Prado	Italy, Brazil, USA	PM World Journal	Maturity in Project Management: The Italian Experience	62 companies: private enterprise, government, third sector NGOs	2014	Prado	Google Scholar	"project management maturity" & Prado	614	5	Brazil/Italy
24	Laice de Souza	Brazil	PM World Journal	Project Management Maturity Model: The case in an automotive industry in Brazil	Automotive	2017	Prado	Google Scholar	"project management maturity" & Prado	614	3	Brazil

#	Authors / Organisation	Nationality of the authors	Journal / Conference	Name	Area of research	Year of creation	Model	Source	Keywords / Different search method	Hits	Citations on Google Scholar	Country of Origin (Paper)
	Scotelano et. al.											
25	Füssinger	Austria	PROJEKTMANAGEMENT Group	Maturities of project-oriented companies of about 15 project-oriented nations	Public services, engineering/construction, consulting	2006	Gareis	Google Scholar	"project management maturity" & Gareis	426	15	Austria
26	Gareis; Huemann	Austria	The Gower Handbook of project management	Maturity models for the project-oriented company	General	2007	Gareis	Google Scholar	"project management maturity" & Gareis	426	53	Austria
27	Supic	Croatia	8 th International Conference on Telecommunications (IEEE Xplore)	Project management maturity of selected organizations in Croatia	IT companies	2005	OPM3	Google Scholar	"project management maturity" & OPM3	3190	25	Croatia
28	Guangshe et al	China	International Conference on Information Management	Application of Organizational Project Management Maturity Model (OPM3) to Construction in China: An Empirical Study	Construction	2008	OPM3	Google Scholar	"project management maturity" & OPM3	3190	44	USA / China
29	Silva et. al.	Portugal	International Conference on Project Management	OPM3 Portugal Project: Analysis of Preliminary Results	100 organizations, from various activity sectors	2014	OPM3	Google Scholar	"project management maturity" & OPM3	3190	18	USA
30	Silva et. al.	Portugal	IEEE International Conference on Industrial Engineering and Engineering Management	Project Management Maturity: Case study analysis using OPM3 model in manufacturing industry	Manufacturers of machines for the extractive and construction industries	2019	OPM3	Google Scholar	"project management maturity" & OPM3	3190	0	USA
31	Katane; Dube	South Africa	The International Conference on the Internet, Cyber-Security and Information Systems	The influence of organizational culture and project management maturity in virtual project teams	Banking, manufacturing, mobile services, insurance, IT developers, internet solution firms	2017	OPM3	Google Scholar	"project management maturity" & Culture	4680	6	South Africa
32	Bay; Skitmore	Australia	Journal of Building and Construction	Project management maturity: Some results from Indonesia	Institutions, Consultants and Manufacturers	2006	KPMM	Google Scholar	"project management maturity" & Kerzner	3340	34	Indonesia
33	Ofori; Deffor	Ghana	International Journal of Business Administration	Assessing Project Management Maturity in Africa: A Ghanaian Perspective	200 managers from different economic sectors	2013	KPMM	Google Scholar	"project management maturity" & Kerzner	3340	18	Africa
34	Polkovnikov; Ilna	Russia	27 th IPMA World Congress (Procedia Social and Behavioural Science)	The Reality of Project Management Practice in Russia: Study Results	Information Technology, Financial Services, Engineering & Construction, Telecommunications, Oil & Gas, Education, Consulting and others.	2014	KPMM	Google Scholar	"project management maturity" & Kerzner	3340	11	Russia
35	Berssaneti; Carvalho	Brazil, Brazil	International Journal of Project Management	Identification of variables that impact project success in Brazilian companies	Engineering and construction companies, the transformation industry, consulting services and information technology companies (IT)	2015	KPMM	Google Scholar	"project management maturity" & Kerzner	3340	190	Brazil
36	Young	Australia	International Journal of Managing Projects in Business	Project, programme and portfolio maturity: a case study of Australian Federal Government	Australian Federal Government agencies	2014	P3M3	Google Scholar	"project management maturity" & P3M3	902	34	Australia
37	Narbaev	Uzbekistan	PM World Journal	An Assessment of Project Management Maturity in Kazakhstan	Construction and engineering, Oil & Gas, service (marketing, finance etc.), and education and research	2015	P3M3	Google Scholar	"project management maturity" & P3M3	902	4	Kazakhstan
38	Backlund; Chroner, Sundqvist	Sweden	International Journal of Managing Projects in Business	Maturity assessment: towards continuous improvements for project-based organisations?	Project departments in project-oriented construction companies	2015	P3M3	Google Scholar	"project management maturity" & P3M3	902	27	Sweden
39	Sukhoo	Mauritius	Phd Thesis	AN EVOLUTIONARY SOFTWARE PROJECT MANAGEMENT MATURITY MODEL FOR DEVELOPING COUNTRIES	Software development	2009	ESPM3	Google Scholar	"project management maturity" & ESPM3	6	5	South Africa
40	Bushuyev	Ukraine, Netherlands	International Journal of Managing Projects in Business	IPMA Delta and IPMA Organisational Competence Baseline (OCB).	Research on IPMA model	2014	IPMA	Google Scholar	"project management maturity" & "IPMA Delta"	187	90	Ukraine
41	Bushuyeva et. al.	Ukraine	2018 IEEE 13th International Scientific and Technical Conference on Computer Sciences and Information Technologies (CSIT)	IT Projects Management Driving by Competence	IT projects	2018	IPMA	Google Scholar	"project management maturity" & "IPMA Delta"	187	1	Ukraine
42	Vasili Osmakov et. al.	Russia	IPMA SEENET 2019	Efficiency and effectiveness evaluation of project-oriented activities in the Ministry of industry and trade Russia	Ministry of Russia	2019	IPMA	Google Scholar	"IPMA Delta" & assessment	182	0	Russia
43	Cooke-Davies	USA	The Wiley Guide to Managing Projects	Project Management Maturity Models	PMMM Comparison	2004	PMMM; OPM3	Wiley Online Library	"project management maturity" & OPM3	3190	136	USA
44	Khoshgoftar; Osman	Malaysia	IEEE International Conference on Computer Science and Information Technology	Comparison of Maturity Models	PMMM Comparison	2009	OPM3, P3M3, KPMMM	Google Scholar	"project management maturity" & comparison	3740	133	Malaysia
45	Iqbal	France	CRC Press	Organizational Maturity – Managing Programs Better	PMMM Comparison	2012	KPMMM, PMMM, OPM3, P3M3	Google Scholar	"project management maturity" & comparison	3740	6	France
46	Farrokh; Azhar	Pakistan	World Academy of Science, Engineering and Technology	Project Management Maturity Models and Organizational Project Management Maturity Model (OPM3®): A Critical Morphological Evaluation	PMMM Comparison	2013	OPM3, P3M3, PMMM	Google Scholar	"project management maturity" AND comparison	3740	25	Pakistan (presented in Switzerland)
47	Torres	Portugal	PhD. Thesis	A contingency view on the effect of project management maturity on perceived performance	PMMM Comparison	2014	OPM3, Gareis, PM3M, KPM3	Google Scholar	"project management maturity" & comparison	3740	20	Switzerland
48	Achibald; Prado	Brazil, USA	PM World Journal	Introduction to Maturity in Project Management	PMMM Comparison	2014	OPM3, KPMMM, IPMA, Prado, PM Solutions	Google Scholar	"project management maturity" AND comparison	3740	5	USA, Mexico, Brazil
49	Pasian	Netherlands	International Journal of Managing Projects in Business	Extending the concept and modularization of project management maturity with adaptable, human and customer fact	PMMM Comparison	2014	OPM3, P3M3, KPMMM	Google Scholar	"project management maturity" & Culture	4680	29	Netherlands
50	De Souza; Gomes	Brazil	Information Technology and Quantitative Management (ITQM 2015)	Assessment of Maturity in Project Management: A Bibliometric Study of Main Models	PMMM Comparison	2015	OPM3, KPMMM, PMMM; Prado	Google Scholar	"project management maturity"	9240	39	Brazil

Appendix B: Definitions on Organisational Project Management

There are certain success factors that influence project management practices. On the one hand processes make up an important part, on the other side competences of individuals are as important as well (cf. Bushuyev 2014, p. 306). Therefore, the goal of this chapter is to provide a structured listing of general dimensions that influence project management on organisational level. Figure 11 gives an overview on the ingredients of project management competences on organisational level.

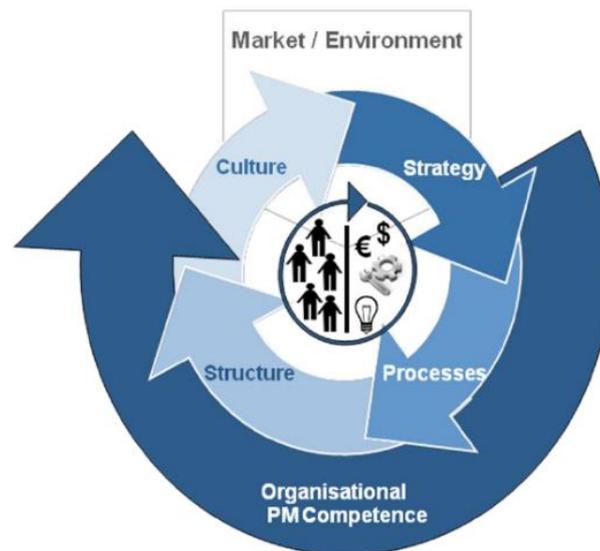


Figure 11 Organisational project management competence

Source: (Wagner 2012, p. 50)

Based on the market environment, a corporate strategy is developed. A project-oriented culture, an aligned organisational structure and standard project management processes should enable the organisation to achieve those strategic goals. Hence, projects, project programmes and project portfolios are developed and aligned with the corporate strategy (cf. Wagner 2012, p. 50). Table 9 contains definitions of general concepts that are used in OPM.

Table 10 Terms and definitions in organisational project management

Source: Own creation

B1 Corporate Culture and Project Management
<p>Schein formally defines culture “as accumulated shared learning of that a group as it solves its problems of external adaption and internal integration; which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (Schein; Schein 2016, p. 6). Culture is further defined as the set of refined behaviours people have and strive toward in their society. This includes the totality of knowledge, belief, art, morals, law, customs, and other capabilities or habits acquired by the individuals of a society. Also every organisation has a unique culture that is formed by its members and environment</p>

(cf. Cleland; Ireland 2006, p. 464). Since the 1980s authors are researching on the “behavioural side” of management and organisation or organisational culture. And that companies emphasising importance on key managerial components like employees, customers, or leadership outperform those that do not have those cultural characteristics (cf. Yazici 2009, p. 16). Trompenaars and Hampden-Turner define corporate culture as “*The way in which attitudes are expressed within a specific organization...*” (Trompenaars; Hampden-Turner 2012, p. 11). The debate between successful and not-so-successful organisations can be related to an organisation’s values, beliefs and principles that exert strong influence on all members of an organisation who are doing projects in or for it (cf. Cooke-Davies; Arzymanow 2003, p. 472). Many authors stress on the importance of aligning the corporate culture with project team culture. They see this as an enabling factor for improving project management leading to better project performance (cf. Belzer 2001, p. 2; cf. T. L. Doolen; M. E. Hacker; E. M. Van Aken 2003, p. 286; cf. Cooke-Davies 2004, p. 1251; cf. Mohammed; Prabhakar; White 2008, p. 4).

B2) Organisational Structure and Project Management

An effective project management organisation requires that the organisational structure is aligned towards the importance of its projects. It is proven that organisational structure influences a projects outcome. Based on a study conducted by PriceWaterhouseCoopers (PWC), 59% of the reasons that project fail can be traced back to organisational aspects (cf. Nieto-Rodriguez; Evrard 2004, p. 15–16). Structural components enabling project management can be definitions of clear roles and responsibilities, support and involvement of senior and top management and the implementation of a Project Management Office or PMO – see Appendix B10 (cf. Nieto-Rodriguez; Evrard 2004, p. 5).

B3) Project Management and the Project Management Process

The PMI defines projects “...as a temporary endeavour undertaken to create a unique product, service, or result” (PMI 2003, p. 22). Or, “as the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements” (PMI 2003, p. 22). A process is a series of steps or actions with the goal to achieve a result. The project management process can be defined as series of actions (embodied in a process) done by a team and other stakeholders to reach certain targets including a schedule, budget, and other technical performance objectives (cf. Cleland; Ireland 2006, p. 51). While project “...processes describe how an organization's inputs are converted into outputs, project practices describe how processes are carried out” (Cooke-Davies 2004, p. 1245).

Certain subprocesses are attached to project management like, the project start or initiation of a project, project planning, a continuous project execution and coordination, project monitoring and controlling, the resolution of a project discontinuity, and project closedown (cf. PMI 2017a, p. 23). The project management process also requires the right application of different project management methods (embedded in the project methodology) like a work breakdown structure, the schedule, cost and resource plans, risk analysis, stakeholder and environmental analysis, and so on (cf. Gareis 2004, p. 129–130).

The management-level must understand that having a project management process in place is just as important as an order-to-fulfil cycle within the finance department. It is the systematic and organised compendium of processes that bring order and efficiency towards deliverables and team management independent of size of any project. Project management processes are often grouped into a project management methodology. With such methodologies in place, companies are more likely to successfully complete their projects (cf. Nieto-Rodriguez; Evrard 2004, p. 4).

B4) Project Management Body of Knowledge (PMBOK®)

The PMBOK® is developed by the *Project Management Association* (PMI) and is based on ANSI (American National Standards Institute) standard *The Standard for Project Management*. The PMBOK® consists of descriptive project management practices that have proved to be successful. The PMI defines the PMBOK® “...as a term that describes the knowledge within the profession of project management (PMI 2017a, p. 1)” It defines a common project management vocabulary, a code of ethics and a professional conduct. The global code of ethics consists of the values responsibility, respect, fairness, and honesty (cf. PMI 2017a, p. 2–3). The PMBOK® clusters project management into process groups and knowledge areas. The process groups are (1) initiating, (2) planning, (3) executing, (4) monitoring and controlling, as well as (5) closing of a project. In 2017, the known knowledge areas that are defined by the PMBOK® are (PMI 2017a, p. 23–24):

- *Project Integration Management*
- *Project Scope Management*
- *Project Schedule Management*
- *Project Cost Management*
- *Project Quality Management*
- *Project Resource Management*
- *Project Communications Management*
- *Project Risk Management*
- *Project Procurement Management*
- *Project Stakeholder Management*

B5) Project Programme Management

Companies utilise projects to implement beneficial changes according to their organisational strategy (cf. Görög 2016, p. 1; cf. Pennypacker; Grant 2003, p. 4; cf. Wagner 2012, p. 47). In mature organisations those strategies are segregated into smaller strategic objectives which may be organised as so-called project programmes. Underneath a project programme, projects would have their individual business-cases that are aligned towards the overall programme objective. Hence, it is defined as “...the centralized, coordinated management of a program to achieve the program’s strategic objective and benefits.” (PMI 2003, p. 24). It “...focuses on the interdependencies between projects and between projects and the program level to determine the optimal approach for managing them” (cf. PMI 2017a, p. 14). The duration of a project programme is usually longer than the individual project and exists as long as the objective or benefit are satisfactory implemented (cf. Iqbal 2013, p. 486). The overall goal of program management is to allow individual projects on the one hand, but to ensure

benefits of organisational learning, economies of scale, and networking synergies on the other hand. Therefore, a specific programme organisation is created (cf. Gareis 2004, p. 130).

B6) Project Portfolio Management

Project portfolios are closest to the organisational strategy. A portfolio is a collection of projects and programmes grouped based on the organisation's strategic objectives (e.g. based on divisions, groups, business units, etc.). Projects and programmes included might not necessarily be related to each other. It is the most strategic discipline mostly related to general management (cf. PMI 2003, p. 25). They play an important role, as they are in place to ensure that project investments are managed most appropriately. According to Gareis (cf. Gareis 2004, p. 134) it serves the following objectives:

- Definition of project priorities
- Coordination of internal and external resources
- Organisation of learning of and between projects
- General optimisation of the result of the project portfolio, rather than of single projects

Because portfolio management is situated in the strategic level of project management, it is not involved in the daily operations in programme and project management. Therefore, the maturity requirements of a portfolio management are completely different compared to programmes and projects. Iqbal states that most project management maturity models lose track of that organisational maturity level (cf. Iqbal 2013, p. 487).

B7) Development of the Project Personnel

While the business process of HR according to the PMBOK® Guide looks after the recruitment of the right project members (e.g. project manager), personnel development serves the preparation of the project personnel in terms of education (cf. Grobler; Steyn 2006, p. 4). Competencies are defined as self-organisational dispositions of thought and action. Hence, a person can apply knowledge in a self-organised manner. "*They enable a specific situation to be managed or a specific role in a specific social context to be fulfilled*" (Gareis; Gareis-Halpin; Gareis 2018, p. 172). In terms of project management, competence can be defined as knowledge, skills, behaviours, and experience that is required for fulfilling a business process or perform a work role properly (cf. Gareis 2004, p. 136; cf. APM 2012, p. 84).

B8) Project Stakeholder

Stakeholders could be people, groups, or organisations that potentially have impact or be impacted by project. Hence, stakeholder management includes processes that are required to identify them, to assess the degree of their impact and then to effectively plan, manage, and monitor the effective engagement with stakeholders during the project (cf. PMI 2017a, p. 503).

B9) Transnational Project Management

Section 1.1.3 already introduced trans-nationalisation of project management. International projects happen within multinational enterprises, multinational consortia, or joint ventures. This transnational project management is characterised by high complexity

due to multiculturalism within teams, electronic communication and coordination and stakeholder management. Within this environment certain enablers and barriers of project management exist. On the one hand those can be situated on organisational level, like the project organisational structures and cultures (cf. Cooke-Davies; Arzymanow 2003, p. 474). And on the other hand, on individual level, like cultural and geographical distance and understanding (cf. Aubry; Hobbs; Thuillier 2007, p. 767), language barriers (cf. Pazderka; Grechenig 2007, p. 86), leadership and establishing of relationships and trust (cf. Antantalmula; Thomas; Tell 2008).

Therefore, the term of *transnational project management* is used in this thesis for referring to international projects and their characteristics, such as team members with different cultural backgrounds, language, or geographical and temporal dispersion.

B10) Project Management Office (PMO)

The Project Management Office (PMO) is a permanent organisational unit that usually has the ownership over the project management approach. The PMO is responsible for the coordinated management of projects, programmes, and portfolios under its domain. (cf. Cleland; Ireland 2006, p. 200). Its main goal is to establish a common project management approach across the organisation (cf. Gareis 2004, p. 139). Additionally, it acts as a centralised pool of knowledge on project management within the organisation and coordinates communication across projects (cf. PMI 2013, p. 20). Further it offers services like coaching and mentoring, establishing PM career paths, acting as a datacentre for knowledge and lessons learnt and providing software tools to enable project management practices. It also works on the continuous improvement of project management in the organisation (cf. Kerzner 2001, p. 99).

Appendix C: PMMMs from emerging markets

Table 10 provides summaries on PMMMs developed in emerging markets and used for this thesis to complement findings and the conclusion.

Table 11 PMMMs from emerging markets

Source: Own creation

C1) Evolutionary Software PM3 (ESPM³)

The Evolutionary Software Project Management Maturity Model (ESPM³) was developed by Sukhoo et. al. in Mauritius in 2007. The model was based on the assumption that developing countries (cf. Sukhoo et al. 2007). It was based on the reason that software project management methodologies available were developed in the Western/European countries. Which is derived from previous research by Stuckenbruck and Zomorrodian (1987) and Muriithi and Crawford (2003). Both studies were conducted in developing countries (e.g. Africa,) and revealed that those general concepts cannot be applied universally due to cultural differences. They argue that existing practices are based on certain behavioural assumptions (e.g. values at work) that are not valid in some cultures. Which can lead to rejection and failure of certain practices (cf. Stuckenbruck; Zomorrodian 1987, p. 170; cf. Muriithi; Crawford 2003, p. 318). Hence, Sukhoo tried to develop a PMMM that is simplified in order to be successful in countries like Mauritius that struggles with issues like the lack of skilled labour, lack of training, lack of management commitment and lack of soft skills in project management. Sukhoo argues further that existing standards like the PMBOK® Guide do mention that a project in the context consider political, economic, demographic, and cultural norms. However, it does not explain how or when to handle them (cf Sukhoo et al. 2007, p. 101).

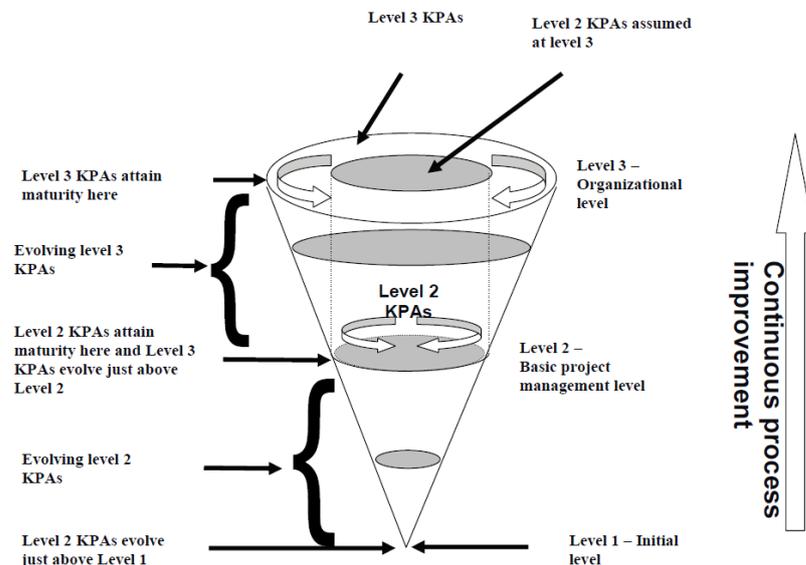


Figure 12 Conceptual Representation of ESPMMM

Source: Sukhoo et al. 2007, p. 105

The following figure gives a conceptual overview on the ESPM³ that inherits different dimensions (key process areas or KPA's) and three different levels of maturity (cf Sukhoo et al. 2007, p. 105).

C1.1) Dimensions of the ESPM3

Sukhoo defines eleven KPAs in the ESPM³. In the process of defining these KPAs, Sukhoo took strong orientation on the PMI PMBOK[®] (cf. Sukhoo et al. 2007, p. 104):

- *Time Management*
- *Cost Management*
- *Quality Management*
- *Human Resource Management*
- *Risk Management*
- *Soft Skills Management*
- *Contract Management*
- *Change Management*
- *Software Specific Focus*
- *Integration Management*
- *Environmental Management*

This analysis focuses on the dimensions of Soft Skills management and Environmental Management. All other dimensions focus on technical project process areas that are not relevant for this thesis. According to Sukhoo, Soft Skills Management highlights the importance of human relationships in the management of software projects. Soft skills are summarised as follows (cf. Belzer 2001, p. 3; cf. Sukhoo 2009, p. 165–175):

- **Communication Skills:** Communication in terms of openness and honesty should be encouraged. Including different means of communication, like formal meetings, informal discussions and reports, and so on.
- **Team Building:** Includes the right selection of team members with an appropriate set of skills. Then, team building should encourage group identity and norms. Conflicts should be identified and resolved in an early stage. Teamwork has to be facilitated and promoted by the project manager.
- **Creativity:** Different combinations of components, templates and technique to implement software. Soft skills required are the appreciation of abilities between team members, and acceptance of individual preferences.
- **Leadership:** The project manager needs to be capable of understanding different leadership behaviours including how and when to apply those. Leadership skills include abilities to inspire, motivate and direct people, and making decisions. Good teamwork should be established through consensus building between project managers and team members. Consensus building can be handled via listening and understanding reasons for de-motivation.
- **Organisational culture dissemination:** Project managers can disseminate and adopt the organisational culture throughout the project team. With the goal of conveying sense of identity among team members and enhancing the internal social system stability.
- **Stress Management:** Software project management is a source of stress. A project manager must be able to manage stress in order to not be overwhelmed by it.
- **Trustworthiness:** This is the basic requirement for a successful cooperation. A project manager needs to convey that he/she can be trusted towards partners and the project team. All relationships pertaining on the execution of a project are based on trust.

- Conflict Management: Conflict resolution skills are required to detect and resolve conflicts as soon as possible. A project manager needs the ability to manage conflicts efficiently. The project manager has to negotiate the resolution by utilising skills of reasoning, persuasion and suggesting alternatives (cf. Sukhoo 2009, p. 699).
- Change management: Besides managing changes that come with changes in project objectives, one additional aspect is dealing with the resistance of people. Changes need to be communicated transparently, and people's concerns and fears have to be considered (cf. Sukhoo 2009, p. 698).

Further, Sukhoo defines other factors that a project manager has to cope with, like (cf. Sukhoo 2009, p. 688):

- Individualism/Collectivism: This is the ability to understand the cultural nature of staff in terms of their individualistic (ties with others like family are loose, staff may perceive work as more important than others) or collectivistic (ties with others, including family, are strong and therefore others are viewed with greater values) nature.
- Uncertainty avoidance: As the extent to which low risk taking and emotional resistance to change are preferred.
- Infrastructure: As the ability to deal with problems related to new technology, communication infrastructure, and so on.

Environmental management covers cultural, economic, social, political and legal aspects. Sukhoo attributes most importance on the cultural perspective, as Mauritius counts as multi-cultural society. Hence, project managers need to motivate people with different cultural backgrounds (cf. Sukhoo 2009, p. 190). Additionally, environmental management covers the circumstance that communication in South Africa is frequently not based on a person's first language (cf. Sukhoo 2009, p. 200).

C1.2) Levels of Maturity of the ESPM3

The assessment of maturity in the ESPM³ is done in terms of processes, documentation, management commitment and defined KPAs (cf. Sukhoo 2009, p. 256). Each of the defined KPAs is whether assigned to a level of maturity or subject of continuous improvement. KPAs subject to continuous improvement are required at each level of maturity. Those are soft skills management, change management, software specific focus, integration management, and environmental management. The others are split as follows (cf. Sukhoo et al. 2007, p. 105-110):

Level 1: Initial: At this level, project management is carried out ad-hoc. Therefore, this level is considered the "chaotic" level and has no KPAs associated with it.

Level 2: Basic project management level: At this level, only the essential hard skills, time, cost, and quality management are required in order to help the organisation to progress rapidly to this level. Basic project management processes are defined in order to finish projects in time, on budget and with the specified quality standard.

Level 3: Organisational level: Dimensions required in at a specific level are also required in all levels above. That means, that level 3 includes all dimensions from level 2 plus human resource management, risk management, and contract management.

Furthermore, each individual KPA is carried out within the so called PDCA (Plan-Do-Check-Act) circle that was adapted from the ISO9001 standard (Sukhoo et al. 2007, p. 104):

1. *Plan: Establish the objectives and processes necessary to deliver results in accordance with customer requirements and organizational policies.*
2. *Do: Implement the process.*
3. *Check: Monitor and measure processes and products against policies, objectives and requirements and report the results.*
4. *Act: Take actions to continually improve process performance.*

C1.3) Applied research with the ESPM3

Sukhoo applied the ESPM³ onto single software projects in 2007 and documented each case-study (cf. Sukhoo 2009, p. 260–313). Each dimension is walked through the PDCA cycle according to the level of the assessment and adapted onto the individual project. Also, all soft skills are being worked through and applied to each case.

Summarised, the ESPM³ is dedicated to single software project management maturity assessment and improvement. Therefore, it is also being applied per individual project. It is of interest of this thesis to see that the topic around cultural aspect is being considered, as differences in national culture and environment was key driver for the creation of the ESPM³.

C2) Construction Consulting Service PMMM (CCS-PMMM)

The CCS-PMMM was developed in 2020 by Li et. al. in China dedicated to construction consulting services (cf. Li et al. 2020, p. 1). Besides country of origin, a second criteria for choosing this PMMM for the comparison is, that it is based on the framework developed by Pasion. Pasion was one of the first authors to identify cultural dimensions as ingredient for a PMMM framework for E-Learning. Pasion is also one of the co-authors

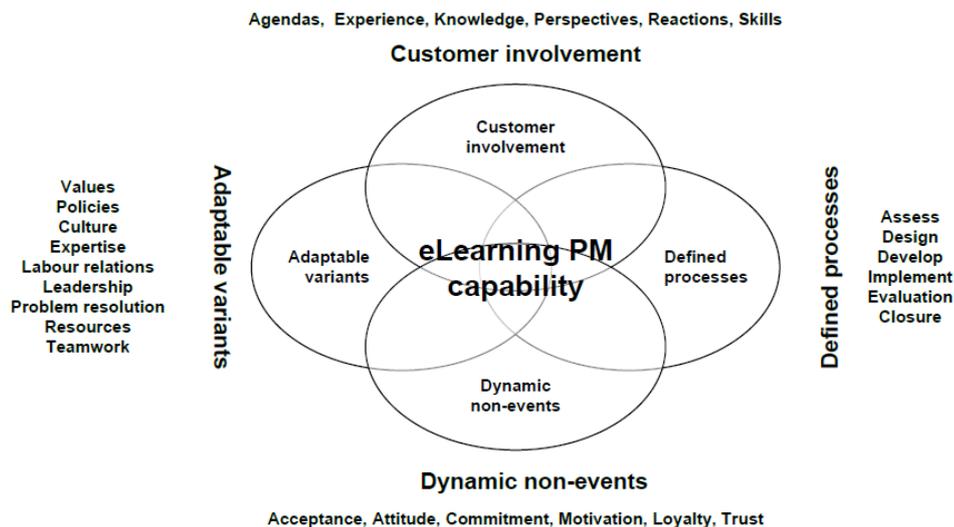


Figure 13 E- E-Learning PMMM conceptual framework

Source: Pasion 2011, p. 196

of the CCS-PMMM. (cf. Pasion 2011, p. 90). The following figure shows the e-Learning PMMM framework by Pasion who tested this on two universities. Basis for the evaluation are four different areas shown in Figure 13.

Li et. al. adapted the conceptual framework and transferred this to the field of construction by utilising semi-structured interviews with people in the industry. Additionally, a case-study at the China Expo was conducted to verify the approach.

C2.1) Dimensions

The following dimensions were adapted from Pasion's eLearning PMMM. Therefore, a description of the dimensions including in the eLearning PMMM is provided followed by a brief overview on the adaptations made for the CCS-PMMM.

Defined processes: Pasion states that defined processes and a specialised project environment are required to ensure a mature project management capability. The model uses the generic instructional ADDIE concept to ensure defined processes. Hereby, the ADDIE concept is completely adapted to eLearning (cf. Pasion 2011, p. 84):

- (A) Analysis of teaching and learning needs, including an as-is assessment.
- (D) Design of the objectives and structure of the instructional programme.
- (D) Development, production and testing of the instructional materials, such as films, study guides, or multimedia.
- (I) Implementation of the programme. Students register to the courses; instructional materials are being delivered to SMEs and tutors interact with students.

- (E) Evaluation including the testing and grading of students, but also the assessment of the effectiveness of the courses and materials.

Customer Involvement: Pasion adopted the concept of customer involvement from other non-project-oriented maturity models. And was based on the research result that eLearning projects consist of multiple touchpoints with customers (defined as somebody who receives a benefit from the product). That involvement is affected by factors like: attitude, motivation and trust among them (cf. Pasion 2011, p. 85).

Adaptable variants: Open coding analysis of different types of maturity models (cf. Pasion 2011, p. 82–83) resulted in dimensions not relatable to repeatability, definability, and manageability. The following dimensions included ranked high in the open coding analysis of Pasion's maturity model collection. The organisation must ensure that certain community values (e.g. academic freedom) are in place that enable project management on organisational level. Further, the dimension expertise outlines that certain professionalism (expertise) can contribute to project success by influencing project members. Contributions might be that project managers reflect their unique perspective, experience and competence. The project manager must be respected and trusted. Achieving this, it requires creativity in managing project resources. In general, the impact of culture needs to be considered. That includes both, in the organisational as well as in the context of team dynamics. The dimension teamwork was also considered when creating the team and defining how they will work which requires the interpretation of community values of an individual team (cf. Pasion 2011, p. 197–198). Further, leadership is a common property that, however, may be adapted differently between organisations and additionally varies in its interpretation and use. A balanced set of leadership skills allows to more effectively work in and influence the culture and politics of a project environment. Hereby, different leadership roles may be used (leader, manager, facilitator, mentor). Another important factor identified is problem resolution and preventing of interpersonal conflicts (cf. Pasion 2011, p. 86–87).

Dynamic non-events: Dynamic non-events are characterised by constant changes to reach a stable outcome rather than continuous repetition. They have been identified as essential for the stability of a systems environment. This domain contains the main factors that contribute to the management of eLearning projects. Their inclusion was based on literature review of project management literature rather than the adaptation of other maturity models. This is based on research results from Kwak and Anbari (2009) who placed emphasis on the “human side of project management” (cf. Kwak; Anbari 2009, p. 101). And, Walker and Johannes (2003) who found that commitment (as the physical and mental manifestation of trust) leads to personal pride and obligation “to do the right thing”. Thus, can manifest in loyalty, leading to long-term relationship for mutual advantage (cf. Walker; Johannes 2003, p. 44). The dimension of commitment and motivation also includes negotiation. Again, Pasion places importance on leadership as influencing individuals can lead to motivation, trust and commitment (cf. Pasion 2011, p. 88–89). Here, trust is defined as own dimension and is placed as the cornerstone of team cohesion. Trust requires clear and regular communication (also of project goals), clear reflection of corporate values, teamwork (including staff selection) and expertise

(somebody they could trust). Additionally, relationship building is affected as it is built on trust (cf. Pasion 2011, p. 208–209).

Li et. al. adapted this framework towards construction in combination with a literature review and expert interviews. The following list shows the most important changes (cf. Li et al. 2020, p. 6):

- The defined process was adapted to fit into the field of construction.
- Communication was added to the dimension of customer involvement. The argument is that there is significant impact on efficiency and effectiveness of the construction process. And becomes even more important in culturally diverse environments like found at construction sites (cf. Dainty; Green; Bagilhole 2007, p. 20). It can improve motivation and streamline processes.
- Factors of acceptance, reaction, value, labour relations, and expertise were eliminated. Acceptance and reaction are contributed to be specifically important in eLearning projects rather than construction. Labour relationship was something that they attributed minimal impact on in China. Expertise was redundant and assessed in customer involvement, therefore eliminated in the adaptable variants. Value was eliminated, due to the assumption that it is included in the culture dimension.

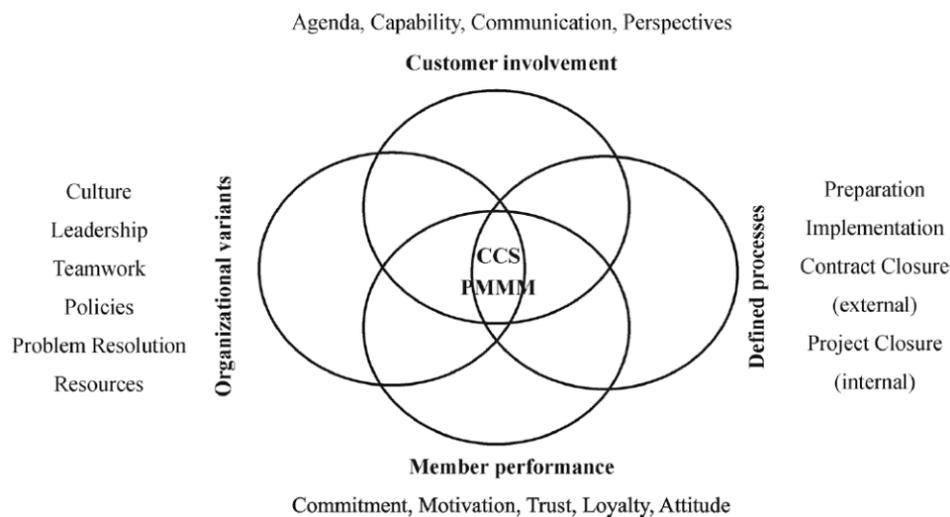


Figure 14 Conceptual model of CCS-PMMM

Source: Li et al. 2020, p. 6

Hence, the conceptual CSS-PMMM shown in Figure 14 derived with strong similarities of the eLearning PMMM framework:

C2.2) Applied research with the CCS-PMMM

As stated, the CCS-PMMM was applied on the overall construction project consultancy for the Shanghai World Expo fair. The overall construction project programme was divided into eleven sub-programmes or projects. Based on the dimensions of the model, all four areas have been applied on the case. The agenda refers to the extent on how the consulting teams meet client demands. Hence, stakeholders were identified and demands evaluated through face-to-face communication exchange. Capabilities of the consulting team were formulated, based on specific project-related experience, and skills. Additionally, communication strategies, like meetings to discuss upcoming issues were

developed and implemented. The overall project team consisted of young people striving for efficiency, and a sense of personal achievement. Hence, the project culture was adapted and characterised with free communication, mutual assistance and respect for unity. Hence, free communication inspired the culture and atmosphere and helped team leaders to obtain and improve. Leadership was defined as being scientific, institutionalised, and standardised project management that strives to make the Expo construction and project management a benchmark in China. Teamwork was observed as holding a strong team spirit. A specific training and development paths were developed and led to high degrees of employee satisfaction (expressed through annual questionnaires and interviews). Mutual trust was established by free experience sharing, and reflection done through weekly meetings. From a project management process perspective, the PMBOK® Guide and other domestic and international standards in project management were used. As a conclusion, non-process factors were critical for the success of the project. Li et. al. stated that team culture and member commitment facilitated the project success in intangible ways. However, it was not quantifiable and hence not measured (cf. Li et al. 2020, p. 10–11)

Statement of Affirmation

I hereby declare that all parts of this thesis were exclusively prepared by me, without using resources other than those stated above. The thoughts taken directly or indirectly from external sources are appropriately annotated. This thesis or parts of it were not previously submitted to any other academic institution and have not yet been published.

Dornbirn, 2nd July 2020

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