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REVIEW ARTICLE

The Project-Oriented Firm and the Role of Project Portfolio Management in Strategic Development: A Review and Analysis

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Abstract: The objective of this paper is the review of the concept Project Portfolio Management as possible contributor to the strategic management thinking of a firm. The method used in this analysis included an in-depth review of the underlying principles and applications of Project Portfolio Management in contrast to strategic management. The results indicate that Project Portfolio Management (PPM) can be presented as a strategic planning alternative to traditional strategy models that supports project success. It is proposed that the use of PPM can improve organisational agility with respect to the development of intended strategies and that, combined with other project management tools, allow a project-oriented firm to better plan for and implement its strategies on the basis of its resources, abilities, skills, risk, stakeholders and competitive advantage. A review of the literature on PPM and an analysis of the approaches adopted by project-oriented firms is undertaken. The conclusion is that the utility of PPM as a strategic planning enabler is a useful tool to consider in the context of strategic planning and management. PPM also contrasts with other strategy development models and can assist organisations to improve project success rates and maturity levels.

Keywords: *Project Portfolio Management, Strategic Management, Project-Oriented Firms.*

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Introduction

According to the Standish Group's (2015) *Chaos Report* [1], which measures project success for information technology (IT) projects globally, the success rate for projects, is well below 50%, and continues to be a problem. The Standish Group's definition of a successful project was redefined in 2015 to include a measure of the value perceived by the customer in addition to the triple constraint of delivering on time, within budget and to the required scope. As a result of adding customer perceived value, the project success rate dropped a further 7% [1].

It has been estimated that one-third of the world's economy is generated through projects [2]. The tangible benefits of projects may include increased sales, increased market share or number of customers, and improved profit margins and cash flows through increased revenue or reduced costs. Intangible benefits might include areas such as improved safety, customer service, and relationships with stakeholders and organisational capability [3].

Materials and Methods

PPM and Strategy

The need to align project delivery capability with corporate strategy is well recognised [4]. Organisations are increasingly realising that corporate strategy is delivered through projects, and that selecting the right projects is key to their ability to deliver the strategic intent required for their strategic alignment [5].

When considering the project life cycle, the fundamental starting point for every project, as defined by the *Guide to the Project Management Body of Knowledge* (*PMBOK*®) [6], and *Projects in Controlled Environments Version 2* (PRINCE2®), is the business case for the decision to support or defer project commencement. The basis of project portfolio management (PPM) is selecting the right projects to manage stakeholder expectations, and to reduce risk and uncertainty [7].

The PPM concept is based on theories of portfolio selection and originates from the

areas of finance and investment with a seminal paper written by Harry Markowitz in 1952 on modern portfolio theory (MPT). The goal of MPT is to optimise a portfolio to generate the highest level of return for given levels of risk. The theory distinguishes between efficient and inefficient portfolios calculating the overall risk return [8].

This was refined in the context of the Capital Asset Pricing Model (CAPM) by Sharpe, creating the basis for modern finance and establishing the three major paradigms for financial portfolio management: firstly, that an investor pursues assets which maximise returns, while minimising the risk of a portfolio; secondly, that multiple optimal portfolios may exist; and thirdly, that diversification leads to the elimination of non-systemic risks [9]. PPM has also been extended to project prioritisation; selection of projects [10]; project evaluation and control [11,12,13]; optimisation of decisions, processes and resources [15, 16].

Strategic Planning and Project Management Success Metrics

Risk management at the portfolio level was first analysed in the early 1980s by McFarlan (1981) [17]. Who advocated taking a risk-based approach to selecting project portfolios? Despite the recognition by several authors that risk management and analysis of dependencies are important, recent publications by academics and practitioners illustrate that portfolio risk management remains a developing research area [18, 19, 20, 21].

Since that time and based on this earlier work, portfolio management has been extended in many areas including product portfolio management [22], research portfolio management [23] and project portfolio management [7]. Project success has been measured in many different ways. Traditionally, its measurement was focused on the triple constraint, namely, meeting the scope, time and cost goals [24].

Shenhar, Levy and Dvir [25] also support the view that the three traditional dimensions of project efficiency are scope, time and cost, with scope having the largest role in terms of impact on customers and their satisfaction, as well as on the business. Munns and Bjeirmi [26] note that much of the previous project management literature considered the measurement of project success at the end of projects when they are delivered to the sponsor, project management is terminated, and project manager's move on to other projects.

More recently, researchers started to increasingly measure success by examining the impact on the organisation rather than only in terms of meeting the triple constraint requirements. Cooke-Davies [27] defines project success when a project achieves its business objectives. Jugdev and Müller [28], in their review of the project success literature over the past 40 years, report that a more holistic approach incorporating several dimensions of measuring success was becoming more evident. Thomas, Jacques, Adams and Kihneman-Woote [29] highlight that the measurement of project success is not straightforward.

Shenhar and Dvir [25] Suggest a Model Based on the Following Dimensions of Project Success, Judged over Different Time-Scales

- Project efficiency (end of project).
- Team satisfaction (end of project).
- Impact on the customer (months following the project).
- Business success (years following the project).
- Preparing for the future (years following the project).

Strategic Managers and Project Managers

As stated by Turner [2], the reward structure in many organisations encourages the project manager to finish the project on time and within budget; however, consideration is lacking of the realisation of benefits and post-project stakeholders. Moreover, current thinking suggests that stakeholders' satisfaction is a primary measure, especially the satisfaction of the primary sponsor [30].

At the end of the project, project success is judged by whether the scope is completed on time and on budget, whether project outputs are delivered to specification, as well as whether benefits are delivered. One can argue that completing a project on time, on

budget and to scope comprises an important part of project success. However, these are

simply the necessary conditions, not the sufficient conditions [30, 31]. The new norm is to consider the importance of broader success measures for projects. For example, the most recent version of the PMBOK® Guide no longer mentions the triple constraint [32].

It now includes customer (stakeholder) satisfaction in addition to time, budget and scope. Future research extending from the current study needs to align with the PMBOK® Guide and focus on the modern concepts of project success and its dimensions comprising scope, time, budget, team satisfaction, customer satisfaction, business success and preparing for the future [25]. It is hypothesized that project success is impacted directly by PPM practices and indirectly through the existence of and functions of the PfMO.

Furthermore, PPM practices have a direct impact on the function of the PfMO (where it exists). The objectives for project success and links to both project portfolio management practices and the functions of a portfolio management office are highlighted in the conceptual research model in Figure 1. The areas of portfolio management practices include those of conducting a portfolio inventory, planning and prioritisation, and portfolio management and control.

The components of a portfolio management office functions are grouped into nine areas as categorized by the PMI. (PMI, nd). By adopting these key objectives of project success suggested in previous research works [6, 7, 24, 28, 30, 31, 32, 33, 34, 35] the impact of the following three variables: (1) project portfolio management (PPM) practices; (2) the portfolio management office (PfMO); and (3) project success can be evaluated.

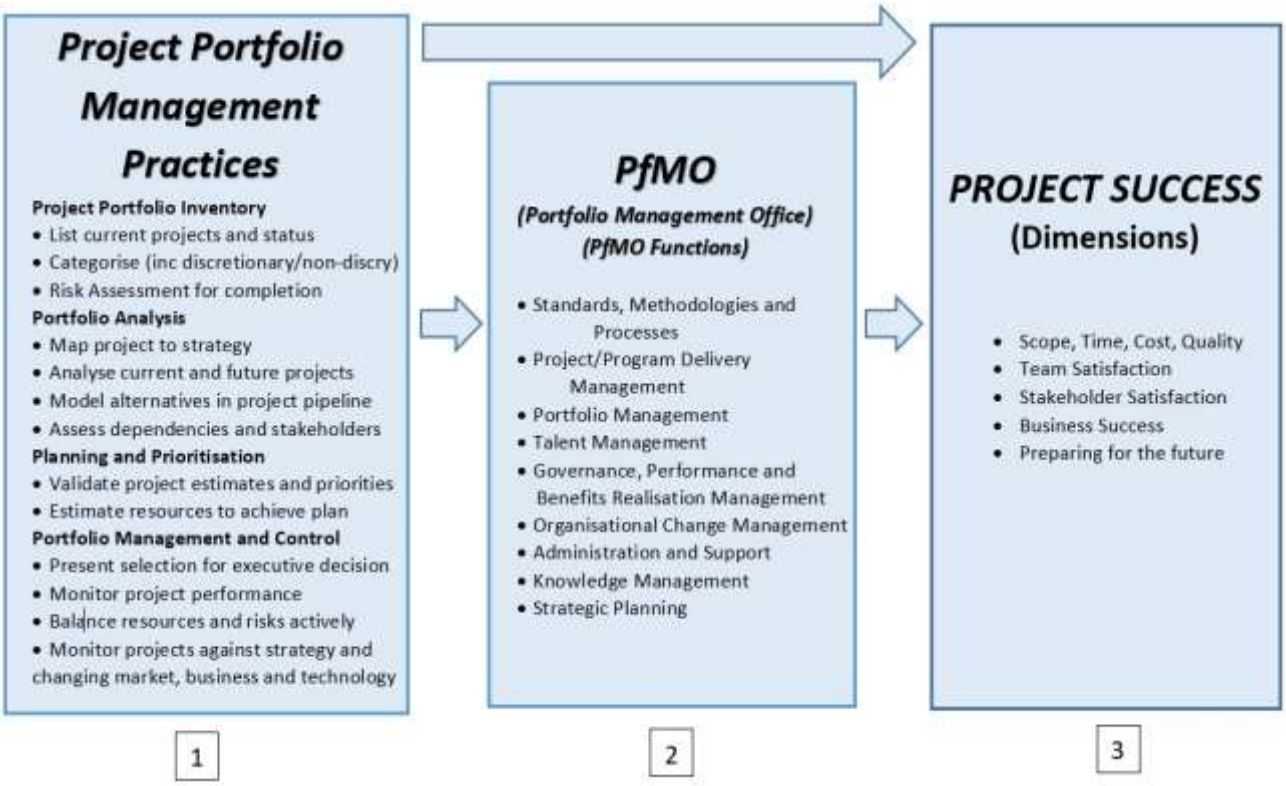

Fig. 1: Detailed conceptual research framework Source: Functions adopted from PMI [7]

Project Portfolio Management (PPM) concepts and Strategic Decisions

Project portfolio management (PPM) is defined in PMI [6] as "a component collection of programs, projects, or operations managed as a group to achieve strategic objectives" (p. 3). From this definition, effective PPM relies on the effective management of its components to deliver outputs that align with organisational objectives. Thomas et al. [36], in their study, confirm the need to align project delivery capability with corporate strategy. According to Crawford et al. [37],

the decision-making processes for project portfolio selection, as well as the tools and capability to carefully select projects to achieve the desired benefits, can impact project success. Furthermore, the organisation's management must aim to optimise the available resources, manage the level of project and portfolio risks, as well as providing strategic alignment.

Viewed as the connection between strategy and procedure, PPM allows a business to convert its vision and ideas into reality and to apply its strategies [38, 39, 40]. In particular, an improvement in any business is a result of effective projects that produce new products [41]. Project portfolio management (PPM) is a component of strategic management practice, which amongst other things, involves decisions by a business on the actions that it needs to undertake to achieve its strategic targets. Through projects, an organisation increases its value [42, 43, 44].

The literature supports the view that PPM aids strategic decision-making that involves determining, reducing and diversifying risk, managing variations, recognising and accepting the need for trade-offs [44]. In its standard for PPM, the PMI, a leading global association in project, program and portfolio management, has compiled the project portfolio management (PPM) concept based on the theories of portfolio selection and originating from the areas of finance and investment in its *Standard for Portfolio Management* [45, 46].

The third edition of this standard [7] was extended to include three portfolio management process groups (defining, aligning and authorising, and controlling) and five portfolio management knowledge areas (strategic management, governance management, performance management, communication management and risk management) with the aim being to cover a wide range of practices for any organisational type and portfolio sizes.

The standard has continued to evolve and change with details of practices and processes in earlier versions of the portfolio management standard still relevant and applicable to industry. Despite the availability of PPM standards and decades of PPM practice implementation, as pointed out by Patanakul [47], the understanding by researchers and practitioners of the constituents of PPM effectiveness remains insufficient, with these affecting business outcomes, financial performance and productivity as well as the morale of project stakeholders. The conceptual problems in the existing body of PPM knowledge, as highlighted in the study by Yong and Conboy [13], include lack of cumulative tradition, lack of clarity, interchangeability of terms such as programs, portfolios and enterprise of projects and multi-project management.

Finally, the lack of theoretical glue, lack of parsimony and limited applicability could all explain the lack of understanding of PPM. Reasons for failure to adopt PPM in business include monetary losses, unmet productivity and the decreased morale of project stakeholders [47]. Martinsuo [48] highlights that the lack of awareness of PPM practices and context could be one of the key explanations for why organisations still struggle with PPM implementation, resource sharing and the constant changes in their portfolios.

As a result, the success rate for the adoption of portfolio management falls behind the expectation. According to Voss and Kock [49], the success of PPM can be evaluated using the measures of: overall business success, average project success, preparedness for the future, the use of synergies, strategic fit and portfolio balance. Furthermore, it is suggested that portfolio value should be taken into consideration, both monetarily and nonmonetarily; to be specific, the larger a portfolio becomes, the greater the need for more accurate alignment between organisational objectives and PPM practices.

Strategic Decision Making and PPM

A key component of PPM is the decision-making process required for the selection of projects, with this used as a means to align projects with strategy [44, 50, 51].

Harris [52] states

Decision-making is the study of identifying and choosing alternatives based on the values and preferences of the decision maker. Making a decision implies that there are alternative choices to be considered, and in such a case we want not only to identify as many of these alternatives as possible but to choose the one that has the highest probability of success or effectiveness and

best fits with our goals, desires, lifestyle, values, and so on. Paryani [53] defines "decision making" as a technique for choosing among different options that are designed to achieve an objective. The three factors underpinning "decision making", according to Derelöv [54], are:

- There must be various options in a decision scenario;
- These options need to produce different outcomes or approaches; and
- There must be expected results; that is, for every choice, certain outcomes need to be more suitable than others.

In the area of PPM, an organisation's strategy needs to be well defined and understood by the decision makers so that projects can be selected to maximise the organisations strategic objectives. Several PPM decision-making tools and models have been developed for PPM implementation to improve organisational project and portfolio management capabilities [11, 18, 51, 55, 56, 57].

Organisations control their projects using a variety of tools and methods developed within PPM processes and procedures, which produce and evaluate project information as well as driving decision making. Studies frequently imply that PPM decision tools and models must be developed over time [15, 40] during which project and portfolio management maturity is developed using different tools and techniques customised and specified for optimum outcomes.

The remarkable increase in best practice research and the growth in PPM decision techniques emphasise the existing links between PPM and improvements in final outcomes [14, 32].

Strategy, Enterprise Operations and PMOs

In the review of literature on PMOs and Pf

MOs, Hobbs and Aubry [58, 59, 60] conducted a three-phase research program to better understand PMOs, Pf MOs and their functions in practice. The first phase was a descriptive survey of 500 offices, which identified 27 functions that had been accepted as a baseline and were well cited by the academic community. The second phase of their study was conducted in 2008 using in-depth case studies of four organisations.

The third and final phase involved the analysis of data gathered in Phase 1. Hobbs and Aubry [58] identified different types of offices including "enterprise", "departmental" and "program–project" offices through an examination of the scope of services performed within the respective offices. As a result, the 27 functions previously identified by Hobbs and Aubry [58] were examined for functions related to projects, programs and portfolio management for this study and used in the survey questionnaire.

It should be noted that the term 'PMO' used in the PMI standards is a generic term and, throughout the standards, it is not clearly presented whether the responsibilities are those of a project, program or portfolio management office (PMO, Pg MO or Pf MO). Furthermore, many works in the literature define and name PMOs differently with terms such as project support offices (PSOs), project offices (POs) or even project-managed organisations. Some PMOs are also program and portfolio management offices (Pg MOs and Pf MOs) with varied functions and configurations (59, 61, 62, 63, 64, 65].

These PMOs have various levels of maturity and perform support functions for PPM and other organisational functions, such as assisting with customer support services [66, 67, 68]. Building on the works of Hobbs & Aubry [58] and Pinto et al. [61], the current study adopts the 27 functions and maps them to respective offices as shown in Table 1 below.

Project Functions and Strategic Business Unit Functions

Table 1: PMO, Pg MO and Pf MO function mapping

	Function (% of 500 PMOs that considered function important)	Project PMO	Program PgMO	Portfolio PfMO
1	Report project status to upper management (83%)	X	X	X
2	Develop and implement a standard methodology (76%)	X	X	
3	Monitor and control of project performance (65%)	X	X	

4	Develop competency of personnel, including training (65%)	X	X	
5	Implement and operate a project information system (60%)	X	X	
6	Provide advice to upper management (60%)	X	X	X
7	Coordinate between projects (59%)	X	X	X
8	Develop and maintain a project scoreboard (58%)	X	X	X
9	Promote project management in organisation (55%)	X	X	X
10	Monitor and control performance of PMO (50%)	X	X	X
11	Participate in strategic planning (49%)		X	X
12	Provide mentoring for project managers (49%)	X	X	
13	Manage one or more portfolios (49%)			X
14	Identify, select and prioritise new projects (48%)	X	X	X
15	Manage project documentation archives (48%)	X	X	
16	Manage one or more programs (48%)		X	X
17	Conduct project audits (45%)	X	X	
18	Management of customer interfaces (45%)	X	X	
19	Provide a set of tools without an effort to standardise (42%)	X	X	
20	Execute specialised tasks for project managers (42%)	X	X	
21	Allocate resources between projects (40%)		X	X
22	Conduct post-project reviews (38%)	X	X	
23	Implement and manage database of lessons learned (34%)	X	X	
24	Implement and manage risk database (29%)	X	X	
25	Benefits management (28%)		X	X
26	Networking and environmental scanning (25%)		X	X
27	Recruit, select, evaluate and determine salaries for project managers (PMs) (22%)	X	X	

Source: Hobbs and Aubry (58]

The mapping shown in Table 2 shows a comparison of the functions of the PMO, Pg MO and Pf MO. A disconnection is found between the theoretical model constructed from the PMI's standards and practices for the implementation of project, program and portfolio management and the studies conducted by Hobbs and Aubry [61]. Some functions which could potentially contribute to project success are not being performed in practice. There is a gap in practices which should be explored further by investigating the functions that have not been performed. The Pf MO functions are explored in detail in the 3rd edition of PMI's *Standard for Portfolio Management* [7].

Table 2: Mapping of additional PfMO functions (derived from PPM standard)

	Function	**PMO**	**PgMO**	**PfMO**
28.	Assist with business case development and review	X	X	X
29.	Manage portfolio dependencies			X
30.	Set up project portfolio systems and software			X
31.	Assist with the categorisation and prioritisation of projects within the portfolio			X
32.	Track the portfolio benefits			X
33.	Maintain the project portfolio inventory			X
34.	Perform project portfolio analysis			X
35.	Perform project portfolio planning			X
36.	Manage the tracking of project portfolio resources			X
37.	Track the alignment of projects with strategy			X
38.	Manage the optimisation of the portfolio			X

39.	Define and maintain project portfolio policies and frameworks			X
40.	Provide project portfolio reporting			X
41.	Negotiate and coordinate enterprise resources			X
42.	Identify and manage portfolio risks			X
43.	Identify and manage portfolio issues			X
44.	Conduct and manage portfolio communications			X
45.	Develop and improve portfolio templates and checklists			X
46.	Monitor compliance to portfolio policies			X
47.	Provide project portfolio knowledge management			X
48.	Manage the operations of systems that provide portfolio management			X
49.	Manage portfolio stakeholders			X
50.	Directly manage projects within the portfolio			X
51.	Conduct training in portfolio management skills and tools			X
52.	Manage and support project portfolio software			X

The function mapping shown in Table 2 are derived from the *Standard for Portfolio Management* [11] Additional PPM functions from Table 2 have been added to the Venn diagram, as shown in Figure 2 below.

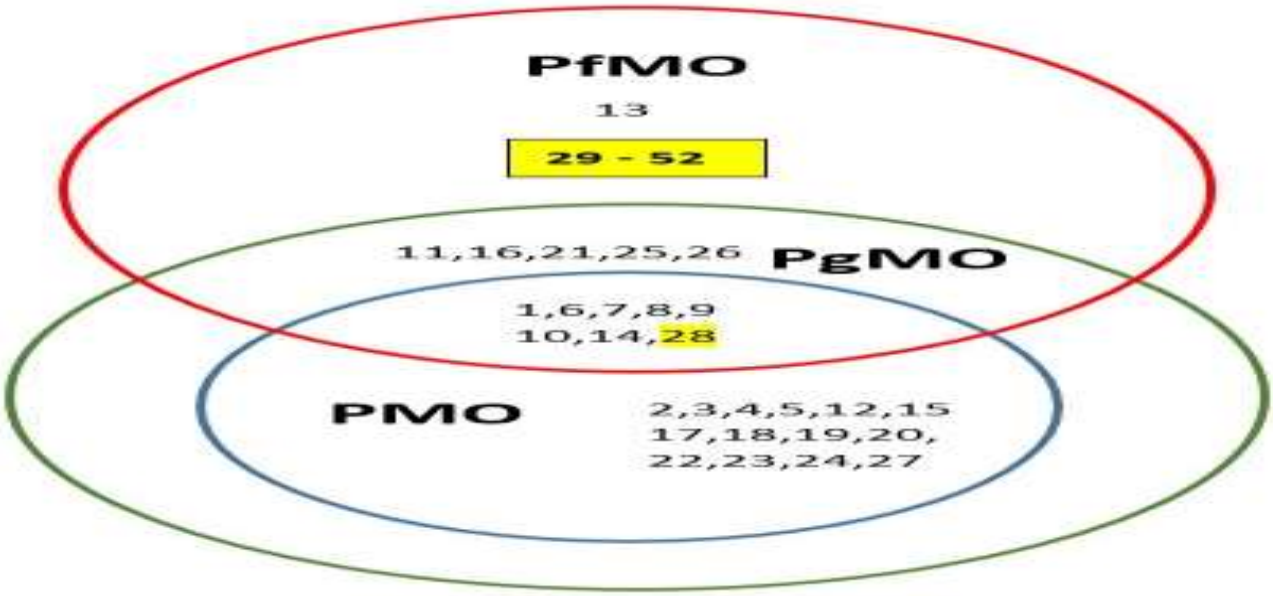

Fig. 2: Additional Pf MO functions highlighted

Together they represent all of the potential functions of the PMO, Pg MO and Pf MO and have therefore been included on the survey questionnaire to determine whether these functions are practiced and examine their importance. Some organisations have used portfolio and project management offices (Pf MOs and PMOs) to overcome some of the challenges identified by Elonen and Artto [69]. Several definitions and names are used for PMOs, these organisational structures that provide support; standardise project-related governance and processes, and facilitate the sharing of resources, methodologies, tools and techniques for projects [11]. Some PMOs are also program and portfolio management offices (Pg MOs and Pf MOs) and are used to support PPM functions. Table 3 below presents the nine capabilities of a portfolio management office (Pf MO) identified by the *PMO Quick Tip Guide* (PMI, n.d.). The significance of each capability to the Pf MO is indicated, ranging from 'critically required' to 'moderately important', as described in Table 3. The functions of a Pf MO, as set out by the PMI (PMI, n.d.) and shown in Table 3, have been adopted in the current study.

Table 3: Capabilities of the Pf MO and their significance

Capabilities	Significance to PfMO
C1 Standards, Methodologies & Processes	Critically Required
C2 Project/Program Delivery Management	Moderately Important
C3 Portfolio Management	Critically Required
C4 Talent Management	Critically Required
C5 Governance/Performance/Benefits Realisation Management	Critically Required
C6 Organisation Change Management	Critically Required
C7 Administration and Support	Moderately Important
C8 Knowledge Management	Critically Required
C9 Strategic Planning	Critically Required

Source: PMI (n.d.)

Each capability and its level are dependent on the level of project and portfolio management maturity. The capabilities of project and program delivery management, as well as administration and support, are seen as moderately important at the portfolio level (however, they are critically important at the project level).

Product Lifecycle and PPM Life Cycle Models

Defining a PPM lifecycle and the roles of stakeholders at each phase of the lifecycle assists with the development of the PPM framework. Both PPM and computer science literature provides a wide range of life cycle models [22]. One example is the widely implemented computer systems development life cycle (SDLC) which is used as a project life cycle model to describe the technical phases of software development [70]. Each of the PMI standards for project, program and portfolio management respectively provide life cycles which describe the managerial steps involved to start and complete a project, program or portfolio. As PPM is still an emerging discipline, several PPM life cycle models can be found in the literature with the ones most frequently cited discussed below.

From a PPM perspective, various stakeholder groups are involved, such as the portfolio sponsor, governance body, PMO, contract management, component teams, portfolio manager and external stakeholders. Table 4 presents each stakeholders role, level of interest and expectations as described by PMI [50].

Table 4: PPM stakeholder roles, interest and expectations

Stakeholder Groups	Roles	Interest	Expectations
Portfolio Sponsors	Provide funding Provide resources Provide high-level scoping	Benefit and outcomes that meet the organisation's goals	To be informed regularly of portfolio return on investment, key portfolio milestones, risks, cost and schedule
Portfolio Governance Body	Oversees portfolio Sets priorities Manages spending Reports progress	Portfolio performance Governance decisions Change decisions Concerns of sponsors and governance body	To be the most knowledgeable party on portfolio progress against goals
	Manages timely delivery of benefits		To be aware of all developments of consequence
PMO	Ensures portfolio management best practices are being followed	Project progress Lessons learned Developing PMO materials for future use	To receive notification of all portfolio changes and portfolio needs
Contract Management (vendors, legal)	Ensures funding is intact Manages the contract Ensures efficient availability of contractor	Financial standing Project progress Contract impacts and changes	To be made aware of progress against contractual deliverables To be made aware of any

	staff		changes to the contract including resources requirements
Portfolio Component Teams	Report progress and completion of components	Portfolio changes Portfolio risks and issues	To receive notification of all portfolio changes, risks and issues
Portfolio Manager	Establishes and implements portfolio management Ensures proper communication and coordination among projects Designs and improves appropriate processes Adjusts portfolio components Communicates with the portfolio governing body	Alignment of the portfolio with strategic goals Creating value for the organisation through balanced portfolio components Effective communications between portfolio stakeholders and component managers Efficient use of portfolio resources	To be fully informed of organisational strategic goals and objectives To be provided with sufficient resources for portfolio components To be empowered to communicate with all portfolio stakeholders
External Stakeholders	Stay informed of the funding and direction of the portfolio and its components Execute work decisions based on the progress of respective components	Effect of portfolio and component execution on their requirements and interests	Full and open communications on portfolio and component execution and progress Appropriate consideration of their interests and concerns in the implementation of the portfolio and components

Source: PMI (2017e, p. 66) [50]

In the *Standard of Portfolio Management* [32], the PMI highlights the importance of stakeholder engagement, as each PPM stakeholder (portfolio sponsors, governance body, PMO, contract management team, portfolio component [project] teams, portfolio manager and external stakeholders) has different interests and expectations. Table 4 highlights PPM stakeholder roles, interests and expectations but does not indicate which part of the PPM lifecycle stakeholders are involved with. The understanding and development of a PPM lifecycle is an important component of a PPM framework to further clarify roles and responsibilities.

IPMA's PPM Life Cycle Model

The International Project Management Association (IPMA) is a federation of 70 member associations. These member associations develop project management competences in their geographic areas of influence, interacting with thousands of practitioners and developing relationships with corporations, government agencies, universities and colleges, as well as training organisations and consulting companies (IPMA website). The IPMA does not define a PPM life cycle as it is regarded as a competency rather than a process-based standard. The IPMA Competency Baseline (ICB4-2017) describes competencies in three areas: perspective, people and practice. It defines PPM in terms of the competencies that an individual needs to develop to manage a portfolio. It lacks the clarity of process found in the other standards and includes 14 practice-based competencies outlined below.

The IPMA Competency Baseline (ICB4-2017) has 10 People-based Competencies

- Self-reflection and self-management
- Personal integrity and reliability
- Personal communications
- Relations and engagement
- Leadership
- Teamwork
- Conflict and crisis
- Resourcefulness
- Negotiation
- Results orientation and 14 practice-based competencies:

- Portfolio design
- Benefits
- Scope
- Time
- Organisation and information
- Quality
- Finance
- Resources
- Procurement
- Plan and control
- Risk and opportunity
- Stakeholders
- Change and transformation
- Select and balance

Lastly, it has Five Perspectives

- Strategy
- Governance, structures and processes
- Compliance, standards and regulations
- Power and interest
- Culture and values

Being a competency-based standard, it is very different to the PMI standards, being designed as an overall guidance for competencies that require development for a project portfolio manager.

Strategy Benchmarking, PPM and Global Standards

The International Organization for Standardization (ISO) is an independent, nongovernmental international organisation with a membership of 162 national standards bodies. Through its members, the ISO brings together experts to share knowledge and develop voluntary, consensus-based, market-relevant international standards that support innovation and provide solutions to global challenges (ISO website).

ISO 21504:2015 project, programme and portfolio management-Guidance on portfolio management is a guidance standard on the principles of project and program portfolio management. It is relevant to any type of organisation, including both public and private, and any size organisation or sector (ISO website). A small document of 13 pages, ISO 21504:2015 provides an induction and guidance for PPM and has the intention that its guidance should be adapted to suit the specific environment of the project or program portfolio The ISO standard has several prerequisites that should be met before PPM is implemented.

These Comprise Defining the Following

- Portfolio management framework
- Types of portfolio components
- Criteria for selecting and prioritising portfolio components
- Alignment with organisational processes and systems
- Visibility of the portfolio
- Portfolio performance reporting structure

The standard does not go into detail on how these are to be achieved and provides limited guidance and explanation.

The High-level Process in the ISO Guidance Standard Includes the Following Steps in its Portfolio life Cycle

- Defining the portfolio
- Identifying potential portfolio components
- Defining the portfolio plan
- Assessing and selecting portfolio components
- Validating portfolio alignment to strategic objectives
- Evaluating and reporting portfolio performance
- Balancing and optimising the portfolio

In accordance with ISO 21504:2015 and as shown in Figure 3, portfolio management addresses the need for a consistent approach to the management of strategically aligned projects, programs, portfolios and other related work within an organisational environment in order to:

- Enable investment in portfolio components to be aligned with the organisation's strategy;
- Optimise organisational capability and capacity;
- Maximise benefits from investment;

- Identify and manage stakeholders' expectations;
- Provide visibility of portfolio component activity and status.

The principles described above should be applied regardless of the organisational environment. In addition, for portfolio management to maximise benefits aligned to the organisation's strategy, these prerequisites should be in place to support portfolio management.

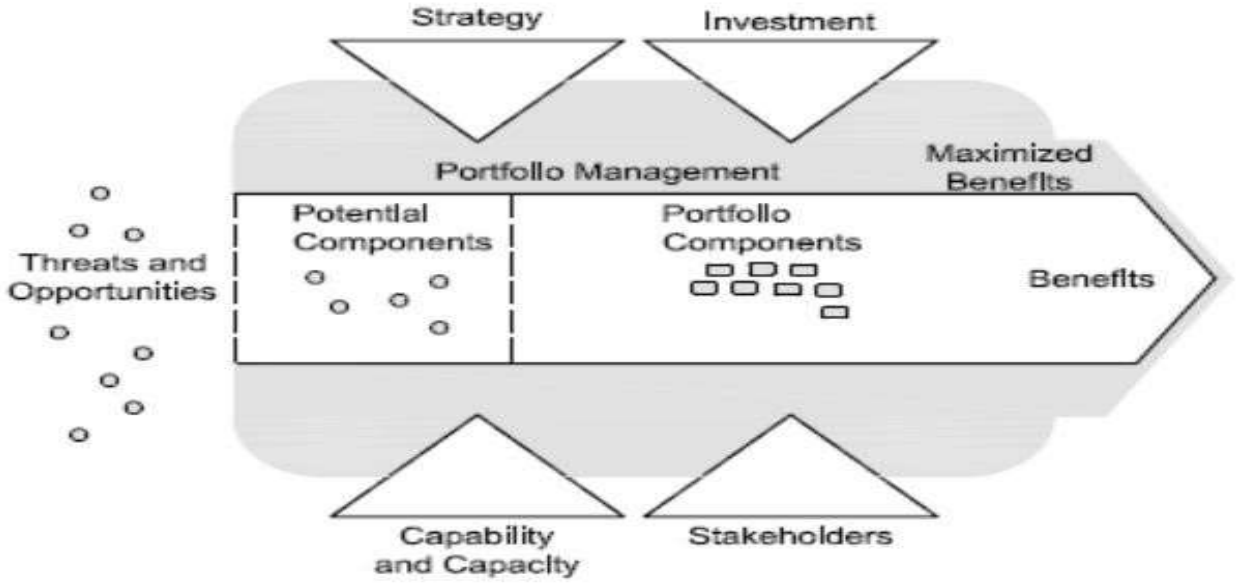

Fig. 3: Portfolio management in context

Source: ISO 21504:2015

Portfolio management aligns portfolio components with an organisation's strategic objectives, stakeholder priorities and values, such as sustainable practices and ethical principles. As shown in Figure 4, PPM is an ongoing continuous cycle and decision-making process, whereby an organisation's list of portfolio components is subject to periodic review regarding their alignment with the organisation's strategy, capabilities and constraints.

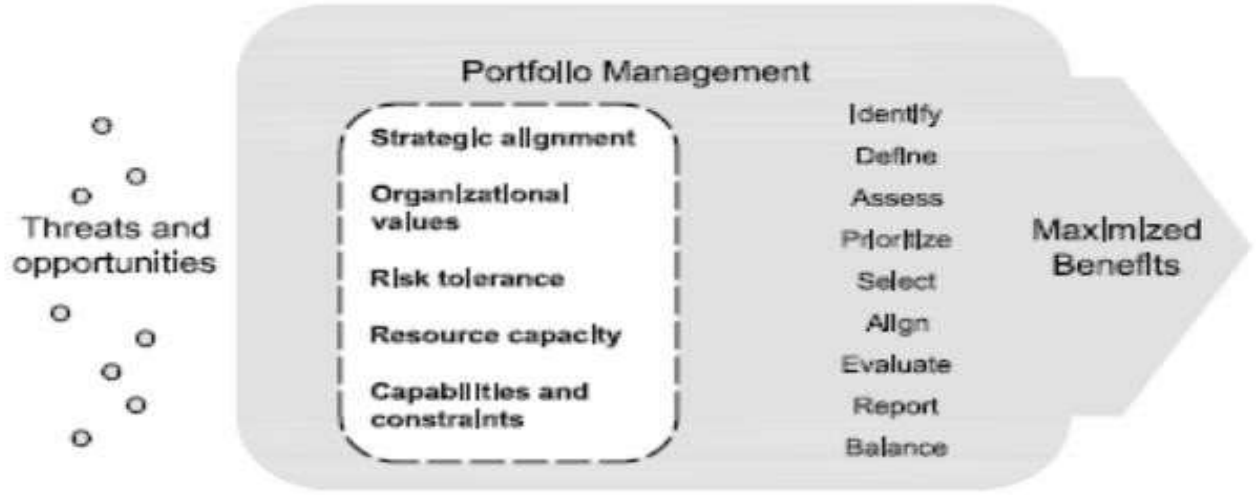

Fig. 4: Portfolio alignment

Source: ISO 21504:2015

Development of the ISO standard for PPM will continue although, currently, it is a long way behind the other predominant PPM standards of PMI. However, the current study has found it important to acknowledge the existence of the ISO standard and to understand its concepts to potentially include aspects into the PPM framework

proposed. Furthermore, this supports the point that PPM is a growing area and continues to develop.

Results and Discussion

Strategic Management Models and PPM Maturity Models

The IPMA does not define a PPM life cycle as it is a competency rather than a process-based standard. The IPMA Competency Baseline (ICB4-2017) describes competencies in three areas: perspective, people and practice. It lacks the clarity of process found in the other models. Finally the *ISO 21504:2015 model* provides guidance on the principles of project portfolio management however also lacks the detail of how PPM would be implemented. It is the implementation of PPM that is the focus of the current research.

According to PMI [32], PPM aims to achieve strategic objectives through the centralised management of one or more portfolios. Referred to as a means to deliver value to organisations at the long-term organisational level, PPM aids in selecting the right projects, maximising resource allocation, measuring and evaluating portfolio success, strategic alignment and balance, and value maximisation of portfolio investment [71]. To achieve this strong strategic portfolio, execution is required to maintain organisational competitiveness [32].

The reason for discussing the PPM maturity concept is its relevance for the ongoing maturity of PPM practices and establishing a baseline for the implementation of PPM within an organisation. The measurement of PPM will require the selection of suitable metrics and a component of the PPM framework. Organisations at low levels of maturity will focus on different metrics than organisations with higher levels of maturity [72]. PPM process metrics will be required to drive maturity and support the implementation of PPM.

Maturity models in computer science are well established and have emerged through the introduction and spread of the Capability Maturity Model (CMM®) and its extension, the Capability Maturity Model Integration (CMMI®) [73]. These models from computer science have been extended into the realm of project management and used for evaluating an organisations project management maturity [74].

The PMI [6, 7, 46] identifies five levels of portfolio management maturity (Pf MM) as shown in Figure 5; adhoc, getting started, started and improving, established and optimised for continuous improvement (Figure 5). At level 1 there are no portfolios established, at level 2 some elements are established, at level 3 there are formal PPM processes in place. At level 4 there are tools to track value and interdependencies. Finally at level 5 PPM is a core competency resulting in competitive advantage through strategy.

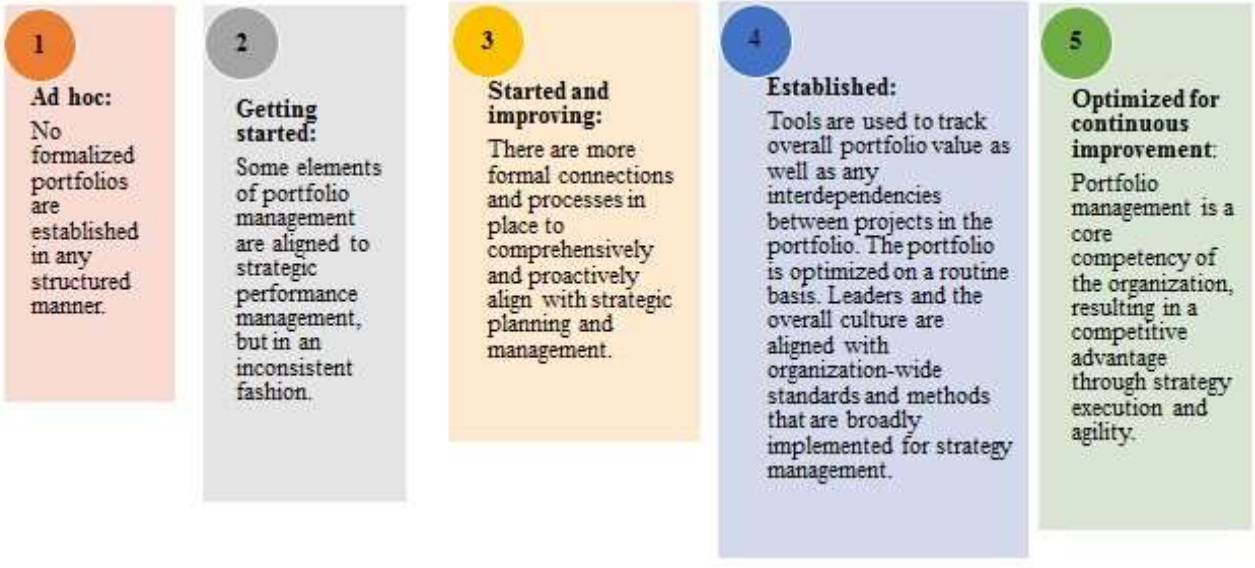

Fig. 5: Portfolio management maturity

Source: adapted from PMI [6]

Other benefits derived from PPM maturity include organisations becoming more flexible, dynamic, innovative, creative, communicative, strategically-oriented, efficient and motivated [75] through aiming to maximise and sustain PPM implementation by achieving a high level of PPM maturity.

Moving from project management maturity with its goal of achieving a return on investment (ROI) from project management improvements, a term introduced by Ibbs and Kwak [76] as PM/ROI, the topic of PPM benefits from portfolio management maturity has become an area of increased interest among practitioners and academics. Young, Young and Zapata [77] state that organisational governance, stakeholder management, management control, risk management, benefits management, and portfolio, financial and resource management are the key PPM maturity attributes.

In their study, PPM maturity was carefully examined using the Australian federal government as a case study. These authors showed that not only were financial management and resource management considered as the only key focus areas in PPM maturity, but factors highly sensitive to PPM maturity were generic attributes of roles and responsibilities, experience, capability development, planning and estimating, and scrutiny and review. The results shown in, Thus, the levels of project and portfolio management maturity are important aspects for the development of a PPM framework for the implementation of PPM to support project success.

Strategic Alignment, Goals and PPM Metrics

The objectives of PPM to support project success, as described by Meskendahl [5] and supported through the literature, are the maximisation of the financial value of the portfolio, linking the portfolio to the firm's strategy and balancing projects within the portfolio in consideration of the firm's capacities. PPM success consists of the average of single project success, project balance and strategic fit, as well as the use of synergies and is positively related to business success consisting of economic success and preparing for the future. Arlt [72] also describes the addition of the fourth goal being that of PPM process maturity.

The fourth goal was a result of portfolio governance research by Müller and Blomquist [12] who, by analysing PPM in high-performing companies, provided evidence in support of the relevance of strategic alignment, portfolio balance and portfolio benefit maximisation. Blomquist and Müller [12] also proposed that a goal of PPM success was PPM process maturity.

Strategic Alignment

The requirement for PPM to be applied in the implementation of strategy has been widely accepted [43]. Breene et al. [78] and Bower and Gilbert [79] analysed the balance between strategic planning and the implementation of strategy in organisations finding PPM can aid in implementing strategy effectively and efficiently. Although defining strategy has matured considerably and has been successfully performed in many organisations, the ability to turn strategy into reality varies widely.

The goal of strategic alignment is further covered by Cooper et al. [22] who define three aspects of alignment: (1) strategic fit-the consistency of projects with the articulated strategy; (2) strategic contribution-the need to execute certain projects to achieve success with a certain strategy; and (3) strategic priorities-the dispensing of resources according to strategic importance. The PPM literature defines strategic alignment as the linking of project portfolios with organisational goals, vision and strategy [80, 81].

Furthermore, project portfolios must support the organisation's vision and strategy and should be executed in a way that they support and maximise the probability of achieving organisational goals, vision and mission [82]. Balancing a portfolio once it is aligned is the second primary purpose of PPM, with various qualitative and quantitative approaches for this purpose having been introduced in the literature [83].

The concept of balance is a common aspect of business as organisations need to balance a range of financial and non-financial goals, as well as operational and project work. However, when conflicting goals are present, decisions about their pursuit become more complex. For example, rigorous cost savings and strategic technology investments constitute this type of goal conflict, requiring

a compromise that reflects the trade-off between these two objectives. A portfolio should also provide a balanced mix of projects, taking into account different time frames and project sizes [82]. This requires negotiation and management between project stakeholders who have conflicting parameters or who require conflicting outcomes. Cooper et al. [22] provide and extensive discussion on the balancing of portfolios and propose a range of balancing dimensions, as shown in Table 5.

Table 5: Examples of balancing dimensions

			Balanced by
Risk vs. Reward	Reward: NPV, IRR, benefits after years of launch; market value		Probability of success (technical, commercial)
Newness Ease vs. Attractiveness	Technical newness		Market newness
	Technical feasibility		Market attractiveness (growth potential, consumer appeal, general attractiveness, life cycle)
Strengths vs. Attractiveness	Competitive position (strengths)		Attractiveness (market growth, technical maturity, years to implementation)
Cost vs. Timing	Cost to implement		Time to impact
Strategic Fit vs. Benefit	Strategic focus or fit		Business intent, NPV, financial fit, attractiveness
Cost vs. Benefit	Cumulative reward		Cumulative development cost

Note: NPV=net present value; IRR=internal rate of return
Source: Cooper et al. (2001a, p. 98) [22]

Profits Pools

Benefits management is at the core of program and project portfolio management (PPM). In the case of PPM, benefits are to be maximised for the individual components of and for the entire portfolio. The tracking, qualification and quantification of benefits constitute a challenge for organisations and require adequate systems. As with the concept of utility in economics, which is highly debated and leads to different utility functions from different perspectives, no clear and unified view is available on how to measure benefits for a portfolio and its components. Most of the literature suggests the use of traditional financial metrics for the determination of benefits, such as net present value (NPV), return on investment (ROI) and internal rate of return (IRR), and proposes a risk-adjusted view similar to the Capital Asset Pricing Model (CAPM), used for the valuation of financial assets [55]. However, limitations occur if using financial metrics alone as projects, unlike capital assets, are "unique endeavours"; hence, the determination of their value is significantly more difficult. Other approaches, as outlined by Norrie [84], make the case for a more comprehensive and balanced view of financial and non-financial portfolio tracking through the application of balanced scorecards (BSCs) for projects.

Conclusion

Project Portfolio Management (PPM) has been presented as a strategic planning alternative to traditional strategy models to assist organisations with strategy implementation and support improved maturity levels and project success rates. A review of the literature on PPM and an analysis of the approaches adopted by project-oriented firms have been undertaken. A number of models for project portfolio management have been presented which can assist organisations with strategic planning and execution. These can be complex and require considerable change management to overcome risk of not realising the benefits of project portfolio management. PPM through the use of a Portfolio Management Office (Pf MO) can improve organizational resilience

and agility with respect to the development of intended strategies when combined with other project management tools, and a project-oriented firm can better plan for and implement its strategies on the basis of its resources, abilities, skills, risk, stakeholders and competitive advantage. The practical implications for managers are that implementing PPM helps re-define strategic objectives in the context of both internal and external market characteristics in a similar way that a Project Management Office (PMO) analyses project deliverables and stakeholders. Dealing with strategic opportunities and threats through the lens of PPM broadens the strategic planning horizon and integrates resilience, innovation and agility considerations into the firm's strategic intent. This paper will be followed by a further analytical study that provides tools and frameworks that strategic managers can consider in their use of PPM principles when implementing strategic plans.

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