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APPLYING A LIFE CYCLE APPROACH TO PROJECT MANAGEMENT METHODS

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ABSTRACT

Project management is increasingly important to organisations because projects are the method by which organisations respond to their environment. A key element within project management is the standards and methods that are used to control and conduct projects, collectively known as project management methods (PMMs) and exemplified by PRINCE2, the Project Management Institute's and the Association for Project Management's Bodies of Knowledge (PMBOK and APMBOK). The purpose of this paper is to apply the life cycle approach to PMMs, stimulate debate on the accuracy and merits of the life cycle approach and to facilitate the development of the life cycle in the future. Currently no life cycle process exists for PMMs. Developed from desk-based research and empirical evidence, a life cycle has been proposed consisting of five stages: Select, Embed, Tailor, Operate and Develop. The stages are explained and a call made for further research to develop and validate the life cycle model.

Keywords: Project management methods

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Abstract

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The purpose of this paper is to apply the life cycle approach to PMMs, stimulate debate on the accuracy and merits of the life cycle approach and to facilitate the development of the life cycle in the future. Currently no life cycle process exists for PMMs.

Developed from desk-based research and empirical evidence, a life cycle has been proposed consisting of five stages: Select, Embed, Tailor, Operate and Develop. The stages are explained and a call made for further research to develop and validate the life cycle model.

Keywords: Project management methods, life cycle

Introduction

The importance of projects and project management methods

"We are in one of those great historical periods that occur every 200 or 300 years when people don't understand the world anymore, and the past is not sufficient to explain the future" (Peter Drucker quoted in Cameron and Quinn 2011 p1). It is often stated by authors like Drucker and others that modern organisations operate in an increasingly competitive area but the data do back up the claims (Cleland and Ireland 1999; Stubbart and Knight 2006; Strangler and Arbesman 2012; Boehm et al 2012). The literature underlines the need for organisations to change in order to survive with projects being used to facilitate change. As Pinto (2013 p24) says "Project are one of the principal means by which we change our world .. the means through which to achieve these challenges remains the same: project management." The Anderson Economic Group estimate that in 2016 32.6 million people across 11 countries will be involved in organisational projects (ISO 2012a). As the number, size, complexity and importance of projects within organisations grow (Pinto 2013), so do the requirement to ensure that projects perform well. Increasingly organisations are looking for ways in which project success can be enhanced and one such factor is the use of a project management method (Wells 2012).

There is no agreed definition of PMMs. We define PMMs as the standard organisational or strategic level processes and procedures used to execute projects rather than the tools and techniques such as risk management and scope management that are deployed at the operational level to manage individual project delivery.

Table 1 lists the current, distinct and dominant methods and standards that can be used to run projects.

Table 1: Project management methods

Method	Description
APM BOK (APM 2012)	Association for Project Management Body of Knowledge Developed by the Association for Project Management A body of knowledge which, in the 6 th edition (2012), covers the sections of context, people, diversity and interfaces. The scope of the APMBOK is wide and encompasses portfolio and programme management, soft skills, and ‘interfaces’ to accounting, health and safety, sustainability etc.
BS 6079 (BSI 2010)	British Standard 6079-1:2010. Project management. Principles and guidelines for the management of projects Owned by the British Standards Institution A set of guidelines covering many types of projects and providing guidance on sponsorship, management, planning, undertaking projects and application of project management techniques. Influenced by the APMBOK.
ISO 21500 (ISO 2012b)	International Organization for Standards 21500:2012 Guidance on project management Owned by the ISO Contains concepts and processes for project management that are considered good practice, usable by any type of organisation for any project. Influenced by the PMBOK.
P2M (PM2 2005)	A Guidebook of Project and Program Management for Enterprise Innovation ‘P2M’ Developed by the Project Management Association of Japan A project and programme management framework focused on adding value while delivering successful projects. The P2M Project Management Tower consists of entry criteria, project and programme management processes and frame elements (eg risk, finance etc).
PMBOK (PMI 2013a)	A Guide to the Project Management Body of Knowledge Owned by the Project Management Institute First mooted in 1986, the first edition was published in 1996 and is updated every four years. Consists of five process groups (initiating, planning, executing, monitoring and controlling, and closing) and 10 knowledge areas. There are four million copies of the PMBOK in print (PMI 2012b)
PRINCE2: 2009 (OGC 2009)	Projects in Controlled Environments Owned by Axelos With the 2009 edition, the method was simplified and made easier to customise. Focus on the seven principles of the business case, organisation, plans, risks, progress, quality and issues/changes.

The extent to which the methods are used in organisations is unclear with conflicting information being presented from multiple, small, often national studies (White and Fortune 2002; PWC 2004; Fortune et al 2011; PWC 2012).

While some organisations use PMMs in their pure form, many organisations will tailor the method to their own requirements. This can be visualised as a continuum with full alignment with the method at one end and little or no alignment at the other (Biggins 2015). Whether pure or tailored, project management methods are important because they are a factor in successful projects due of the standardisation and credibility they bring to an organisation through a set of common practices, tools and techniques, a shared vocabulary and way of working (Eskerod and Östergren 2000; Pitagorsky 2003; Garcia 2005; OGC 2009; Chin and Spowage 2010; Wells 2012; PMI 2013a; Wells 2013). The adoption of a method is one approach adopted to raise the maturity of the project practices within an organisation with research showing that the more mature an organisation's processes, the more successful it is (Ibbs and Kwak 2000; PWC 2004; IBM 2008; Swanson 2012).

Project management methods are deserving of further research because PMMs appear consistently in the Standish CHAOS reports as contributors to project management failure (Wells 2012). Charvat (2003) notes how the adoption of a PMM by an organisation is a strategic decision. The configuration of resources, processes and activities under the umbrella of a PMM can generate a strategic organisational capability (Johnson et al 2008). Strategic decisions such as those to adopt a PMM can be long lasting. The authors are currently working with a national insurance company in the UK who continues to use the same PPM that it developed 9 years ago. Measuring the life of PMMs in years is common to all other organisations with whom we have worked. The rationale for this paper is to propose a PMM life cycle. Such a model could have a positive influence on the part that PMMs play

in organisational project delivery because of the new perspective it offers and the insights gained into why PMMs contribute to failure and how their strategic benefit can be increased.

In this paper we propose a model for the application of a life cycle model to PMMs and, in so doing, fill a gap in knowledge because, as far as we are aware, no author has applied a life cycle approach to PMMs.

Theoretical underpinnings

The life cycle approach

Biological life cycles of birth, growth, maturity, decline and death are the basis for life cycles in business. The cycle of mortal biological life is seen as being applicable to a wide variety of business entities. With its origins in product pricing in the 1950s (Dean 1950), the life cycle was presumed to be a widely understood concept within a decade (Levitt 1965). Since then life cycle approaches have continued to be developed and expanded (Cao and Zhao 2011). The term 'life cycle' is now used in many disciplines and in differing contexts and there are life cycles for organisations, products, software development, information technology and processes.

The life cycle perspective provides a beneficial framework from which to structure a holistic view of an entity because the approach allows all of its aspects to be assessed in a systematic way. Each life cycle is composed of stages. A stage is defined as a major period in the entity's life that is distinguishable from what went before and after it. The perspective recognises and highlights that there are different factors that affect the entity at each stage of its life. A life cycle can be used to gain understanding and control, for operational planning and for forecasting/predicting (Kotler and Keller 2012).

The analogy with biological life may be problematic. People pass through the human life cycle at largely predictable time with the boundaries between stages being well defined either by convention or in law. There is also the definitive end that bounds biological existence. Looking at other entities as though they were analogous to biological processes can distort the view and impose expectations on how the life cycle will linearly progress where such expectations are only partially valid or even completely invalid. Critics point out that applying the approach incorrectly can involve costly mistakes and mean that opportunities are missed (Polli and Cook 1969; Dhalla and Yuspeh 1976) and some question the validity of the approach (Mercer 1993). The life cycle approach creates an idealised view of linearity and predictability and focuses attention on the stages and activities that are defined in the model. This can mean that the inappropriate application of a model or an incorrect model can have negative results but this criticism is relevant to all models and theories which are, after all, no more than simplified abstractions of complex environments. Users should therefore approach life cycles with caution and with a critical appreciation of the benefits and pitfalls of their use.

Defining a life cycle for PMMs

As the term life cycle can be applied in many areas, it is important to define the scope of this paper and what exactly is meant by a PMM life cycle. By PMM life cycle, we mean the stages that an organisation will go through when choosing a method for managing projects, introducing the method into the organisations, executing projects using the method's processes and finally maintaining and enhancing the method.

In defining a PMM life cycle, we are asserting that PMMs have a limited life, that the use of a PMM passes through all stages of the life cycle and that, at each stage, different challenges and opportunities are presented to the organisation using the PMM.

This paper focuses a life cycle relevant to project level management. The linking of projects to programmes and programmes to portfolios and whether programmes and portfolios have a similar life cycle is outside the scope of this current analysis.

Within the domain of project management, projects also possess life cycles which are common stages within the life of the project that are often associated with a sector such as pharmaceuticals, software development and construction and which set out how projects in those sectors are typically divided into phases (Pinto 2013). From a hierarchical perspective, project life cycles are encompassed within the PMM life cycle in the Operate stage.

Research design

This exploratory research sought to create a life cycle model for PMMs, comprised desk-based research underpinned by empirical, practitioner experience. PMM information came from manuals, bodies of knowledge and related books, journal articles and conference papers. The source for life cycle data was books, journal articles and conference papers. While containing no primary data, the research design sought to develop a life cycle model for PMMs that could be justified, based on the available literature. The life cycle was created from an evaluation of a range of existing models. The PMMs were subjectively analysed to link chapters or sections of the relevant publications to stages in the proposed life cycle.

A life cycle can be viewed from different perspectives. For this paper, the perspective of the organisation is adopted because an organisation goes through all stages of the project management method life cycle.

This paper is influenced by the experience and perspectives of the authors and affected by the practitioner experience of working across all stages of the PMM life cycle in public and private sector projects in Europe.

Analysis

From the review of the existing life cycles in literature, the five stage model shown in Figure 1 was developed consisting of the stages: Select, Embed, Tailor, Operate and Develop.



Figure 1: The PMM 5 stage life cycle model

While presented linearly, the model is iterative with feedback loops linking to all previous stages.

The conceptual model was evaluated by overlaying existing models onto the five stages to assess the suitability of the proposed model. This activity, the results of which are shown in Table 2, suggested the proposed model was potentially appropriate for PMMs because the stages from other life cycle could be mapped to the PMM life cycle stages.

Table 2: Evaluating the PMM life cycle

Literature	Select	Embed	Tailor	Operate	Develop
Information technology (Stewart 2008)	Select	Implement			Evaluate
Software development (Hernon 1994)	Analysis	Test Integrate	Specify Design Develop	Operate Modify	Maintain
Product life cycle (Cao and Zhao 2011)	Imagine Define	Realise	Design	Use Support	
Information management (Hernon 1994)		Collect Acquire	Needs definition	Transmit Process Store Disseminate Use	
IT Service (Microsoft 2008)		Deliver	Plan	Operate Manage	

Many life cycles terminate with a stage in which the product or process ceases to be used. The stage can be called disposal, decommissioning, dismantling or retirement and is often characterised by a return to the beginning of the life cycle at which point organisations begin the process and seek an alternative product or service or, in this case, a new way to manage their projects.

The five life cycle stages are described in the following sections.

Stage 1 – Select

Selecting a method is the first stage in the life cycle. Given the costs of implementing a PMM, it is clear that not all organisations would benefit from developing this strategic capability (Charvat 2003). Where organisations are small or carry out few projects, the investment in the method would far outweigh the benefits. For these organisations, an ad hoc process for managing projects would probably be adequate with the spur for change coming from the desire to increase the levels of project success or develop a more repeatable process for project management.

For organisations that are project-oriented or which undertake a significant number of projects for example in IT, construction, engineering, the health service, local and central government, there are benefits to be gained from the use of a project management method as stated in the introduction. While the important of selecting a method is key, the literature was sparse. Most of the literature on PMMs focuses on the later stages of the life cycle with particular attention given to operating of the method. The choice of method is important because of the way it enables or constrains the stages that follow it. Organisations can underestimate the importance of this stage by choosing a method too quickly (Kerzner 2011).

As there are levels of strategy (Johnson et al 2008), we should be clear to which of the three main levels a PMM strategy relates. The highest level of strategy is corporate strategy which

is concerned with the overall purpose and scope of the organisation. The next level is business-level strategy which expresses how an organisation will compete in a particular market. The third tier which is concerned with how the component parts of an company organise themselves and contribute to the higher level strategies is the operational strategy. As operational strategies include information and plans about resources, processes and people (Johnson et al 2008), this is the level at which decisions about PMMs are taken.

Given the hierarchical link between the three strategy levels, the decision to implement a PMM will contribute to business-level and corporate-level strategies and be linked to organisational goals and objectives. Decisions are made in the context of a clear strategic direction which guides decision-makers in the appropriate choice to be made. Depending on the level of decentralisation in the organisation, a decision to implement a PMM could be taken at the corporate-level (for example all parts of the organisation will use a standard method) or the decision may be taken by executives or managers at the business-level (for example the US division uses PMBoK and European division uses PRINCE2). In either case, the implementation would happen at the operational level. It is the case that the configuration of resources, processes and activities does generate a strategic capability (Johnson et al 2008) so Charvat was correct to say that PMMs are strategic.

Central to this decision are the projects themselves. While there is no standard way to define a project, it is recognised that different projects require different approaches (Shenhar 2001). These factors affect how organisations choose an appropriate method. If the organisation undertakes projects of a similar nature, one PMM may suffice but more methods may be required if the projects exhibit wide variation (MacMaster 2002).

The projects carried out, past history of the organisation and the resources available (capabilities, funds, time etc) comprise the situational analysis activity that is undertaken at

this stage (Jennings and Wattam 1998; Johnson et al 2008). The information from this analysis forms the background to the PMM selection. Based on the background, organisations may define what they require from the PMM in terms of its performative aspects (see Table 3) and this will be used to evaluate the different solutions from which one or more can be chosen. The strategic goals set at this stage for the PMM are evaluated in the Develop stage.

Table 3: Performative criteria

Sources: OGC 2002a; MacMaster 2002; Charvat 2003; OGC 2009; Pitagorsky 2003; Bradley 2010; Jenner 2012; Kerzner 2011

Item	Factor
1	What are the weaknesses in the current PMM?
2	Can the organisation select its own method?
3	The same/similar method is in use by other organisations with whom the organisation operates?
4	The PMM offers value for money
5	The right people are involved in selection for example the QA department, middle managers, the executive of the organisation
6	The chosen PMM is relevant to the operating environment of the organisation eg a customer/supplier relationship
7	Stakeholders have been consulted and their concerns addressed
8	The areas not covered by the PMM are known and understood
9	Current processes are understood and baselined
10	The minimum number of PMMs required for all the organisation's projects are used
11	The PMM can map onto the organisation's processes and terminology
12	The implications of adopting a method (eg changes to budgeting and approval processes) are understood
13	Consideration is given to the effort required to maintain the PMM
14	The expected benefits from the PMM are defined
15	The PMM is relevant to the organisation's maturity level
16	Sufficient time is allowed to choose the PMM
17	There is budget and resource to implement the PMM

Activities in this stage: Strategic requirements of the PMM, situation analysis, scope analysis, decision-making and selection, identification of the available options, goal setting (Jennings

and Wattam 1998; Charvat 2003; Johnson et al 2008; PMI 2014). The people involved in this stage may include executives and departmental managers. More research is needed on the people and roles involved in this and all the stages in the life cycle. A prediction about who is involved in each stage of the life cycle is given in Table 5.

Once selected, the next stage in the life cycle is to bring it into the organisation.

Stage 2 – Embed

Embedding is a critical task that organisations need to manage carefully. A recent study found that the main factors constraining the success of a PMM came from this stage in the life cycle, with problems rooted in the organisational environment rather than the method itself (Sargeant 2010). Organisations need to be aware that PMMs are generic products created for as wide an audience as possible and thus they will require a varying level of work to embed them based on the needs and experience of the organisation (MacMaster 2002). A key decision at this stage is where to locate the organisation on the PMM continuum and how to balance the competing demands for standardisation and freedom to respond/agility in the processes (Boehm and Turner 2003).

The complexity of embedding is one reason advanced for why an organisation fails to embed PMMs successfully. Other reasons include a lack of knowledge about how to embed, a lack of commitment to do so (Sargeant 2010), a lack of organisational support and sponsorship (PMI 2014) and poor fit between the method and the project (Wells 2013). A more cogent reason may be the fact that some organisations see the incorporation of a PMM into its working practices as no more than a training exercise (OGC 2002a) rather than as a major change initiative that needs to be managed as a project in its own right (OGC 2002a; Sargeant 2010). There are several change models available, for example, Lewin's Three step model, Bullock and Batten's Planned change model and Kotter's Eight step model (Cameron and

Green 2015) that can be used to guide organisations through the embedding process but there is no information available on the use of such models by organisations in general or for PMMs in particular. More research is needed on how organisations embed PMMs. As with all change projects, this stage involves communication to raise awareness of the PMM vision and to gain the support of those who will be using the new method. The PMI sought to address the issue of embedding by bringing out their practice guide to implementing organisational project management in 2014. A very practical and informative publication, the guide will support practitioners embarking on the PMM journey.

Project/Programme management offices (PMOs) became very popular in the 1990s (Morris et al 2011) as a way of disseminating governance through project activities. PMMs sit well within a PMO or similar governance framework and enable standards, tools and support mechanisms to be established (Pinto 2013). Embedding involves the integration of the PMM with existing business processes (OGC 2002a) and assessing the resources available to the change project (PMI 2014). Just as the Select stage allows the PMM strategy goals to be defined, the governance targets established in this stage can also be used to measure and audit the PMM.

Activities in this stage: Set governance standards, communication of the PMM vision, dissemination of information, gaining buy-in, training, integration with existing business practices. (OGC 2002a; Boehm and Turner 2003; Sheffield and Lemétayer 2010; PMI 2014).

Once the method has been embedded in the organisation, it is available to be used for individual projects. It is expected that each project will use a version of the embedded method that is suitable for its needs (OGC 2009). This process is called tailoring.

Stage 3 – Tailor

Tailoring is the process of adapting a method to the context of the project and is a project-level rather than organisational level activity (OGC 2002a; OGC 2009; PMI 2014). The need for a tailored approach to managing projects has long been known (Shenhar 2001). However, how to achieve that has not been so clear, there being no standard way to select the right level of tailoring for a project (Shenhar 2001). Not tailoring is to be avoided as it is seen a reason for project failure (Shenhar 2001; OGC 2009; Wells 2012).

In determining which aspects of the PMM should be applied to a project, the early advice was to assess the project holistically and look at the amount of activity, number of staff, critical deadlines, degree of change and risk (CCTA 1994). A small project was defined as a project that could be managed using a ‘subset or tailored version’ of PRINCE (CCTA 1994 p7). Maintaining that many areas of the method were required, the guidance suggested that roles could be combined, project managers could work part-time and undertake other project duties, using technology to reduce the need for meetings, combining elements of stages (for example project closure with the end stage assessment) and replacing complicated processes (eg quality review) with simpler processes (eg inspection and walkthrough) (CCTA 1994). From a planning perspective, the advice for small projects was to use templates, include less detail in documents and to use fixed tolerances in plans (CCTA 1994). The 1994 guide for PRINCE2 ran to 30 pages and provided the managers of small projects with lists of areas that could be considered for simplification.

After the publication of PRINCE2 in 1999, a further tailoring guide was published as a separate manual after a 3 year gap. Now 138 pages, the publication complemented the manual by explaining how the PRINCE2 method could be ‘applied’ (OGC 2002a). Tailoring was defined as using the method ‘appropriately’ (OGC 2002a p2). This was to be achieved by implementing the method ‘to a greater or lesser extent, and scaling it’ (OGC 2002a p2).

Scaling recognises that the interconnectedness of the method meant that components could not be omitted but instead carried out with a light touch. Examples of scaling include merging processes and combining documents (OGC 2002a) and working within available resource constraints (PMI 2014).

The 2002 guide provided useful examples to help users tailor the method and contained practical advice likely to make the tailoring more successful. As an example, the guide stated that many organisations have complex standards for configuration management but that these are ‘simply not enforced’ (OGC 2002a p16) and provided suggestion for improvement (simplifying the standards or applying more effort to make them effective). Many organisations have difficulty fully implementing management by exception which is a fundamental aspect of the PRINCE2 method. The guide recognised that some managers have difficulty delegating and like to manage their staff through supervision and that, in these circumstances, if the manager is unwilling to change, it may not be possible to implement management by exception in the project (OGC 2002a).

While these examples illuminated the issues, there was little definitive advice available to project managers on how best to tailor. In addition to the issue of applying PRINCE2, the early versions of the method contained no guidance on people issues, seen as a major omission by some (Morris et al 2011) whereas other PMMs such as PMBOK included this as a core component (PMI 2013a). Within the PRINCE2 realm, this was addressed through the publication of a guide to the people issues in projects which gave generic information to project managers on how to manage the human factors in projects (OGC 2002b).

When the next iteration of the PRINCE2 manual was published in 2005 the tailoring information had been included but there was no information pertaining to the management of people (OGC 2005). The expanding global use of PRINCE2 saw the definition of tailoring in

the 2009 manual increased to include not only the requirements of the project and organisation but also the geography and culture application for the project (OGC 2009). While the breadth of advice was widened, the depth had not increased. Without tailoring the method, project managers were warned that PMMs were unlikely to meet the demands of the project and this could lead to either complete adherence to the method where it is not required or abandonment of the method and replacement by an ad hoc way of managing the project (OGC 2009). The 2009 manual also points out that organisations that have tailored the method are using ‘full PRINCE2’ (OGC 2009 p215) because the method is designed to be tailored and once this has been completed the organisation is using the component parts that are relevant. No organisation should use a PMM without first tailoring it to their needs. The case was well made but the problem remained how to achieve it.

The problem was not solely the responsibility of the method providers. One of the issues underlying tailoring is that there is no standard way to distinguish between projects and this vagueness makes it difficult to select the right approach (Shenhar 2001). This problem is seen in the high level nature of the guidance provided by the OGC since 1994 and the inability to provide more definitive information to those seeking to tailor projects in a way that lead to the most successful outcomes.

Activities in this stage include: Scaling, capability management (OGC 2002a; PMI 2014)

Once the tailoring stage has been completed, the method can be used to manage the project.

This next stage is called operate.

Stage 4 – Operate

The Operate stage is how many people view project management, the executing of a project to achieve its goals and realise its benefits. From the literature, it was the stage that produced

the greatest volume of information suggesting it is one of the most crucial stages in the life cycle.

From reviewing the methods listed in Table 1 it can be seen that the majority of PMMs concentrate on the Operate stage. This is understandable as the PMMs are focused on the delivery of projects and their suppliers would correctly consider the earlier stages in the life cycle to be outside their scope. While this is comprehensible, it leaves organisations in a difficult position of selecting and embedding the PMM with their operation, stages the authors believe are critical to the success of those stages that follow.

Activities in this stage: planning, execution, reporting and communication, risk and issue management, monitoring and control, benefits management (P2M 2005; OGC 2009; APM 2012; PMI 2013a; PMI 2014)

The final stage in the life cycle relates to how organisations learn and improve the way in which they manage projects. Developing a project management capacity provides feedback to the previous stages of embedding, tailoring and operating so that over time, the maturity of the process can be enhanced.

Stage 5 – Develop

The creation of a PMM is less a task to be completed and more a process that needs to be maintained through its life if it is to continue to be successful. Over time, the environment in which the organisation operates changes and it is important that the method is maintained so that it remains up to date, relevant and aligned with the organisational strategy and allied processes.

In addition to maintenance, the develop stage is where organisations can review the goals for the PMM that were established in the Select stage (strategic goals) and at the Embed stage

(governance goals). The results of these internal reviews will feed into the maintenance workstream and also allow the organisation to assess its performance (PMI 2014).

Maintenance and review are two aspects of the Develop stage. Another, arguably more important, aspect is the improvement of the PMM processes. The desire to operate more efficiently and effectively stems from the improvement principles of quality management in the Plan-Do-Check-Act cycle espoused by Deming (1993). For organisations looking to improve, an element of the check step in the cycle is to look externally at how competitors or the industry is performing. The problem is that the desired performance information is often proprietary and not available. To circumvent this information gap, organisations benchmark themselves against a scale that ranges between 1 and 5, matching their level of performance against a number of different criteria. The criteria are combined into a model that encompasses the main characteristics, factors, processes and capabilities of project management. Many models of maturity exist and their use is expanding (Mullaly 2006).

The criteria for measuring maturity commonly to use a scale consisting of 5 levels (Kerzner 2006; OGC 2006; PMI 2013b):

1. Awareness of process / Initial. Projects are run differently from normal business.
2. Repeatable. Projects use their own processes/procedures, to a minimum standard.
3. Defined. Organisational processes as used. Projects tailor the processes.
4. Managed. The organisation measures its ability to carry out the processes and operates quality management processes to improve future performance.
5. Optimised. The organisation uses continual improvement processes in order to optimise processes and further improve future performance.

It makes intuitive sense that organisations with a maturity of Level 1 are unlikely to be able to implement or sustain a PMM. It is only at Level 2, ‘repeatable process’ that a project management approach becomes feasible. Indeed, a method may be adopted to help the organisation reach Level 2. Kerzner (2006) suggests that a ‘singular methodology’ is achievable by organisations at Level 3 in his five level maturity model. As an organisation progresses through the levels of maturity, for example, Level 3, ‘defined process’ and Level 4, ‘managed process’, the method is being increasingly integrated into the culture and processes of the organisation.

Table 4 demonstrates how organisations are engaging with this stage in the life cycle and shows the maturity of organisations from self-reported questionnaires. The table demonstrates the wide range maturity levels but with a move towards higher levels of maturity. The study by PWC (2012) reported that 32% of organisations were striving to reach a higher level of maturity.

Table 4: Average maturity levels

Level 1	Level 2	Level 3	Level 4	Level 5	Sample	Source
33%	20%	26%	9%	13%	200	PWC 2004
57%	40%	3%	0%	0%	22 - 96	Mullaly 2006
14%	53%	19%	7%	7%	42	Grant and Pennypacker 2006
4%	15%	19%	43%	19%	133	PWC 2012

Organisations track their maturity because the underlying belief is that increasing maturity is beneficial. This view was supported by the PWC report from 2004 which found a correlation between strong project management performance and the level of maturity in the organisation. These findings were corroborated by the Project Management Institute’s *Pulse of the Profession* survey in 2012 which was based on the feedback of over 1,000 project managers and concluded that there was a correlation between those organisations with higher levels of

project maturity and the ability to deliver projects successfully (Swanson, 2012). While the evidence supported the link between maturity and performance, such positive results had not been found in all studies. Other research has failed to show that higher levels of maturity were linked to superior performance. One of the issues may be that striving for higher levels of maturity may add little value to the organisation. Research by Wheatley (2007) shows that the level of maturity appropriate for an organisation was dependent on their needs. However, the picture is further complicated by differences in maturity discernible across industries and indeed between different divisions of the same organisation (Pells 1997). This may explain the lack of consistency in the research findings with support for a link being found between maturity and project performance by some (Moraes and Laurindo 2013) but not by others (Yazici 2010). However, in the same research a significant relationship was found between maturity and internal and external business performance by Yazici (2010).

Activities in this stage: Maintenance, internal and external review, process improvement (OGC 2006; Kerzner 2011; PMI 2013b; PMI 2014).

Frequency and duration of the stages

The authors contend that organisations will visit each stage in the PMM life cycle. The Select and Embed stages are likely to be used only once as the PMM is established in the organisation. It is expected that the Tailor and Operate stages will be carried out for every project in the organisation that uses a PMM. Finally, the Develop stage will be used on a recurring basis to monitor, review and make changes to the PMM. As a result of the reviews, small changes may be made to the PMM governance guidelines used in the Tailor and Operate stages with larger changes (for example retraining and revised standards) requiring a greater degree of change management that is better catered for by the activities in the Embed stage.

At this point in the research on the PMM life cycle, it is only possible to estimate the durations of the stages based on the authors' practitioner experience. This estimation is depicted in Figure 2.



Figure 2: The PMM life cycle model showing estimated stage durations

The authors fully accept that more research is required to shed light on the frequency and duration of the stages.

Conclusion

The PMM life cycle which has been proposed and described in this paper arises from the application of the well developed life cycle approach to the area of project management methods, a novel use in the sphere of project management. The model is supported by a wide range of project management literature and the empirical experience of the authors suggests it has some internal reliability.

As an embryonic model, the authors recognise that more work is needed to develop and further validate the model. At present, the boundaries surrounding the model are ill defined, a deficit that will need to be corrected in future research. For example, the role of leadership may have a strong impact on the life cycle, especially in the early stages. Culture is also an environmental factor likely to have a powerful effect on the life cycle. Both of these factors should be reviewed for inclusion in the next iteration of the model.

In developing the model, the authors' aim was to fill a gap in project management literature and also to begin the process of building a framework that practitioners could use when considering how and why a PMM could be implemented in their organisation. It is the

author's belief that the first two stages of the model may have a strong influence on the success of PMMs on organisations.

Table 5 provides a summary of the key elements in the PMM life cycle in this initial version.

Table 5: Summary of PMM life cycle

	Select	Embed	Tailor	Operate	Develop
Objective	Choose an appropriate PMM	Bring the PMM into the organisation	Based on the project, decide how the method will be configured	Manage the project using the method	Review the operation of the PMM and enhance it
Activities	Align with strategy Scope definition Resource assessment Review options Decision-making Goal setting	Set standards and governance Resource assessment Selling the PMM Obtaining buy-in Integration	Scaling Capability assessment	Planning Execution Monitoring Control Risks/issues Reporting Benefits	Maintain Review Improve
Frequency	Once	Once	Every project	Every project	Every review period
Resources involved	Executives Managers	Executives Managers PMO PMs Project staff	PMO PMs	PMO PMs Project staff	Managers PMO PMs Project staff

This paper, which is part of wider doctoral study, has identified a number of areas that would benefit from further research. These can be summarised as:

- Critique/validate the model through testing and review. In this descriptive, exploratory research, only desk-based research was used. Capturing primary data from practitioners and collecting descriptive data for example from different project types, sectors and cultures would prove the model, generate empirical support for the model and increase its analytical and predictive capabilities (Collis and Hussey 2013).
- Refine the activities, frequency and resources involved in each stage. While the Tailor, Operate and Develop stages can be linked to a wide range of supporting documentation, the Select and Embed stages are notable for the paucity of this information. Developing the understanding of these two stages would help practitioners to improve the fit of the PMM to the organisation and its benefit.
- Develop a measurement system and undertake primary research to establish where organisations are located on the PMM continuum (Sheffield and Lemétayer 2010; Biggins 2015). This would provide much needed information on how organisations are using PMMs and facilitate a better fit between the PMM life cycle model and the starting point for the organisation on the continuum.
- How critical are the Select and Embed stages to the success of the PMM within the organisation? This research would help to indicate the importance of the five stages.
- Research the life cycles in programme and portfolio management.
- How decision-making is managed in the Select stage.
- Is there a difference between espoused and in-use processes for PMM? The defined routines may not be used (Feldman and Pentland 2003; D'Addario 2009)
- Do organisations use a change model when embedding PMMs?

It is hoped to continue and extend this research in the future. The authors would be pleased to hear from anyone with an interest in PMMs with a view to the exchange of information or future collaborative research.

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