

The Bleeding Edge of IT Project Methodology

M.T. Steyn de Wet

Department of Industrial Engineering
Stellenbosch University
Western Cape, 7500, South Africa
steyn@steyndewet.com

Corne Schutte

Department of Industrial Engineering
Stellenbosch University
Western Cape, 7500, South Africa
corne@sun.ac.za

Wynand van Dyk

Department of Industrial Engineering
Stellenbosch University
Western Cape, 7500, South Africa
wvandyk@sun.ac.za

Abstract:

The large, complex IT project within a major South African bank, is a multi-faceted temporary organisation. Existing methodologies, standards and bodies of literature leave scope for the construction of a model that aides the customisation of a unique methodology for the individual, large, complex IT project. Distinct portions of a single, large, complex IT project may differ in terms of characteristics and in terms of the organisational unit that delivers the portion. These organisational units may have unique locations within or external to the organisation. It may be desirable for all or most portions of the total initiative to be managed as a single project. In such a case the project management methodology employed must provide a requisite variety of characteristics and adaptability to manage and integrate the diverse portions of the project. In lieu of these requirements, the **Multi-Level Model** of the large, complex project within the large South African bank is proposed. Literature regarding the tailoring of project management methodologies have developed from describing selection, to describing tailoring and more recently the fusion disparate project management methodologies. The **Methodology Customisation Framework** is proposed, presenting valuable and usable theory pertaining to project methodology customisation.

Keywords:

Project Management Methodology, Tailoring, Customisation, Multi-Level Model, Methodology Comparison Framework.

1. Introduction

This paper introduces two items that are intended to be simple and usable, addressing challenges identified in practice and corroborated by literature and publications by professional institutions. The goal is to improve the customisation of project management methodologies. The focus is on projects with technology components, in South Africa's large banks. It is expected that the outcomes would be applicable to technology projects in general. Does project management methodology (PMM) matter? There is empirical literature indicating that the use of a PMM is correlated with improved success rates (Joslin & Muller, 2015), and the argument is supported by other publications (de Carvalho, Patah, & de Souza Bido, 2015) (Kerzner, 2018). The call for research regarding PMM tailoring, by the Project Management Institute (PMI, 2017) further supports the importance PMMs.

Project management success rates are said to be improving (PMI, 2017), should research of project management (PMT) be prioritised? A report by McKinsey in conjunction with Oxford university (McKinsey & Company, 2012) painted a stark picture of the failure of large IT projects often threatening the survival of the firm. Irrespective of

the Project Management Institute's (PMI) finding, contemporary research argues that much improvement is still needed (Hussain & Mkojiogu, 2016) (Khan, 2018) (Alami, 2016) (Jenner, 2015).

Literature regarding project PMM optimisation has developed from selection and tailoring (Conboy & Fitzgerald, 2010) (Hurtado Alegria, Bastarrica, Quispe, & Ochoa, 2011) (Kalus & Kuhrmann, 2011) to creating organisation-specific PMMs (Shenhar, et al., 2005) and creating hybrid PMMs by combining ideas taken from standards, bodies of knowledge (BOKs), approaches and different PMMs. Standards can be used to reinforce PMMs. In some examples an agile methodology is used while governance ideas stemming from more traditional approaches are maintained (Fitzgerald, Russo, & O'Kane, 2003). In other recent cases, agile and traditional PMMs are combined to form new hybrid PMMs (HPMMs) (Karlstrom & Runeson, 2005) (Spundak, 2014) (Nortier, von Leipzig, & Schutte, 2011).

The creation of hybrid HPMMs through the fusion of disparate methodologies and/or BOKs and/or standards and/or approaches to PMT are becoming more common and could be expected to increase in future as best-of-both-worlds 'solutions' are sought.

Professional PM bodies, such as the Project Management Institute (PMI), have called for research relating to PMM tailoring, including the hybridisation of PMMs (PMI, 2017). Furthermore, existing literature lists, as an opportunity for future research, the progression from the creation of an organisation-specific PMM to the creation of a unique PMM for the individual project. (Spundak, 2014)

The creation of a unique PMM for the individual project allows for the customisation of the methodology to cater for the specific requirements of the disparate portions of the project. It may be desirable to manage the product-training of front office staff within the bounds of the same project that also delivers the systems development of this product, to insure integration. The characteristics of project management required for systems development and training may differ vastly. Variety and adaptability are required, different methodologies within the PMM is required for the successful management of the entire initiative as a single project (Reeves, Levin, & Ueda, 2016). In this paper the Multi-Level Model (MLM) of the large, complex IT project in major South Banks and the Methodology Customisation Framework (MCF) are proposed as a simple, usable and adaptable aid to PMM selection, tailoring and hybridisation, referred to as PMM customisation (PMMC) henceforth.

2. High-level introduction to using the Multi-Level Model and the Methodology Customisation Framework

Figure 1 provides a simplified view on the use of the MLM and the MCF. Prince2 describes a project as a temporary organisation (AXELOS, 2017). Seen in this light, the temporary organisation requires an organisational structure, organisational processes, goals, etc. The MLM and MCF provide a point of departure for establishing these for the temporary organisation.

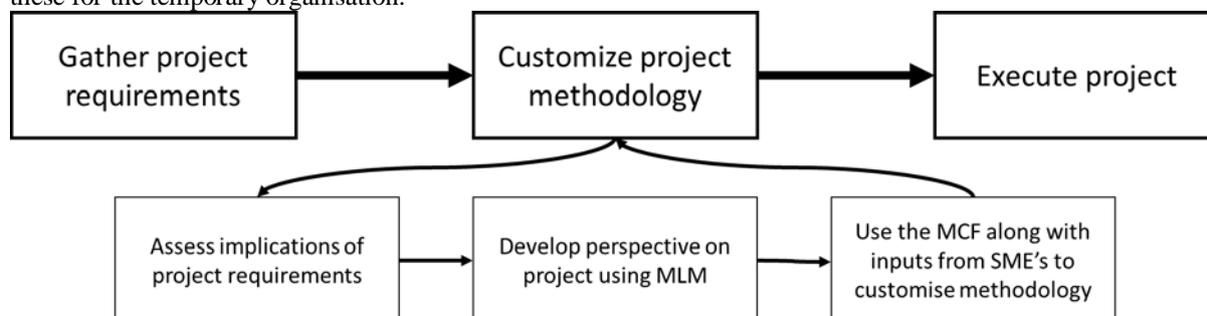


Figure 1: High-level use of the MLM and MCF

Once the requirements of the project have been determined, a balanced perspective is sought by, using the MLM, determining how the portions of the project differ in terms of the type of work required for a portion and where, within or external to the organisation, the work is being done.

When significant differences are identified, the MCF can be used, along with the inputs of subject matter experts (SMEs), to customise the PMM for the project, and also for each significant portion of work. The MLM and MCF is described in more detail in the rest of the paper. Through the decades a silver bullet solution has been sought to PMM optimisation (Berry, 2008), it is rather more likely that continual finetuning of the PMM will lead to organisational advance (Reeves, Levin, & Ueda, 2016). For this reason, the aim of the MLM and MCF is to enable adaptability.

3. The Multi-Level Model

The MLM provides a simple, easy-to-use perspective on the project as a combination of the project's portions and how these portions differ in terms of the location within or external to the organisation where the portions are delivered.

Figure 1, below, provides an example to start from, any organisation can draw its own version of this picture.

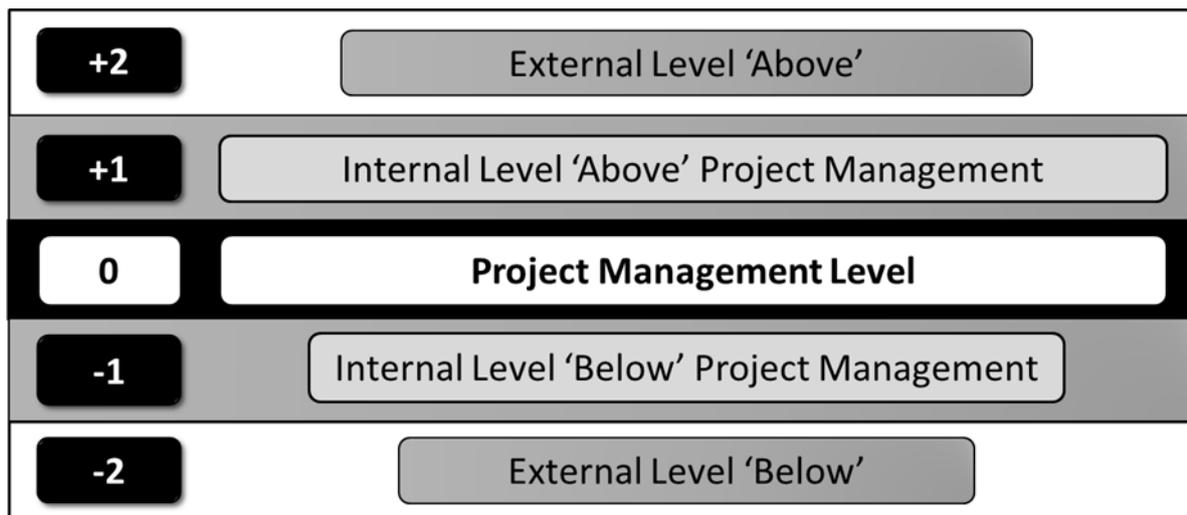


Figure 2: MLM – Example of the locations/levels of organisation where project operates

In this example, three 'levels' are described as internal to the organisation. At level '0' the project management function, including the project office, project governance, project finance etc. is delivered. At level '+1' the owner of the product line requesting and funding the project is seated. Marketing, training of front-office staff, etc. is delivered at this level. At level '-1' technical functions, like systems development, IT infrastructure, testing, etc. are delivered. At the level '+2' external stakeholders are found to whom the organisation must adhere, like the Financial Services Board, the Sarb, Visa, MoneyGram, etc. At the level '-2' third party suppliers are found who must adhere to the rules of the client organisation.

Figure 2 adds some detail to the picture, following from Figure 1, and as discussed in the previous paragraph.

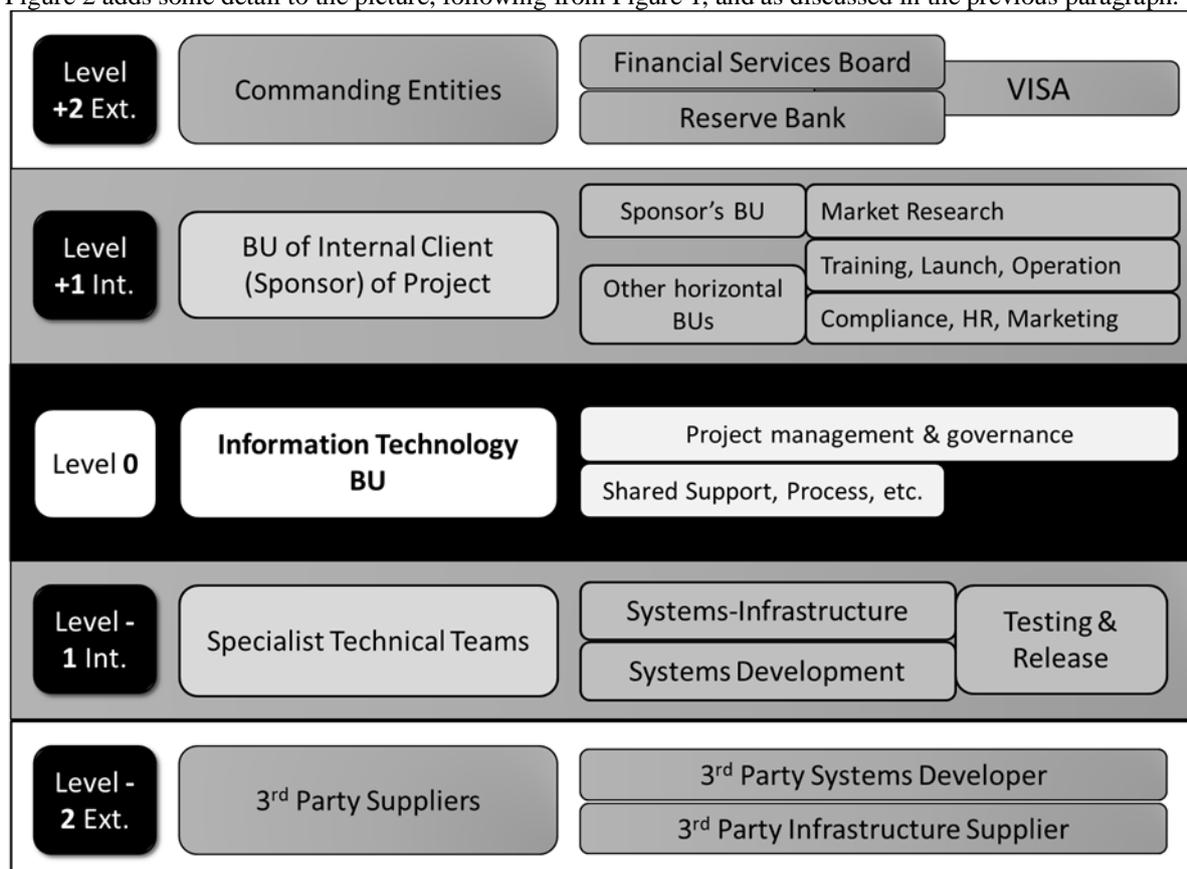


Figure 3: MLM – Examples of the types of functions at various locations (levels)

The reader should note at this point that what is being presented is not at all revolutionary or complicated, it is merely a visualisation of the existing reality of the large, complex IT project. This visualisation can aid the customisation of the PMM for the project:

- The process of designing the aesthetics of a credit card and completing VISA’s approval process is fundamentally different to the systems development that will enable and report on the foreseen transactions wherefore the card will be used.
- Both of these mentioned portions are required for the project’s completion; therefore, it would be beneficial to manage both under the umbrella of a single project for a variety of reasons.
- The aesthetic design of the card is delivered by the marketing team, with the product owner and VISA having to approve the design. Minimum technical requirements will be factored into the design, chip and tap functions, for example. After approval, the production of the physical cards is ordered for arrival prior to testing, implementation and roll-out.
- The transactional component is delivered by a business analyst delivering a business requirements document in conjunction with the product owner or a representative of the product owner, the business requirements are translated into a functional specs document, the systems development team translate the functional specs into a technical specs document, from where coding and testing can be approached.
- The aesthetic design and systems development portions, being vastly different in essence, and in terms of the ‘level’ where it is being delivered, should not be managed by the same methodology. The aesthetic design portion may be best managed without any formal methodology; the systems development portion may benefit from an agile methodology; and the overall project may benefit from a traditional project management approach.
- For successful integration of the portions being delivered, a minimum amount of information has to flow at the necessary interval between the levels where the delivery occurs and the project management function, as illustrated in Figure 3 below.
- The MLM enables systematic discrimination between the different portions of the project and any single portion may be delivered by following a unique methodology and adhering to the minimum information that needs to be provided to the project management function, its standard and the interval at which it should be supplied. This enables the adherence to lean, efficient governance and management of the entire project.

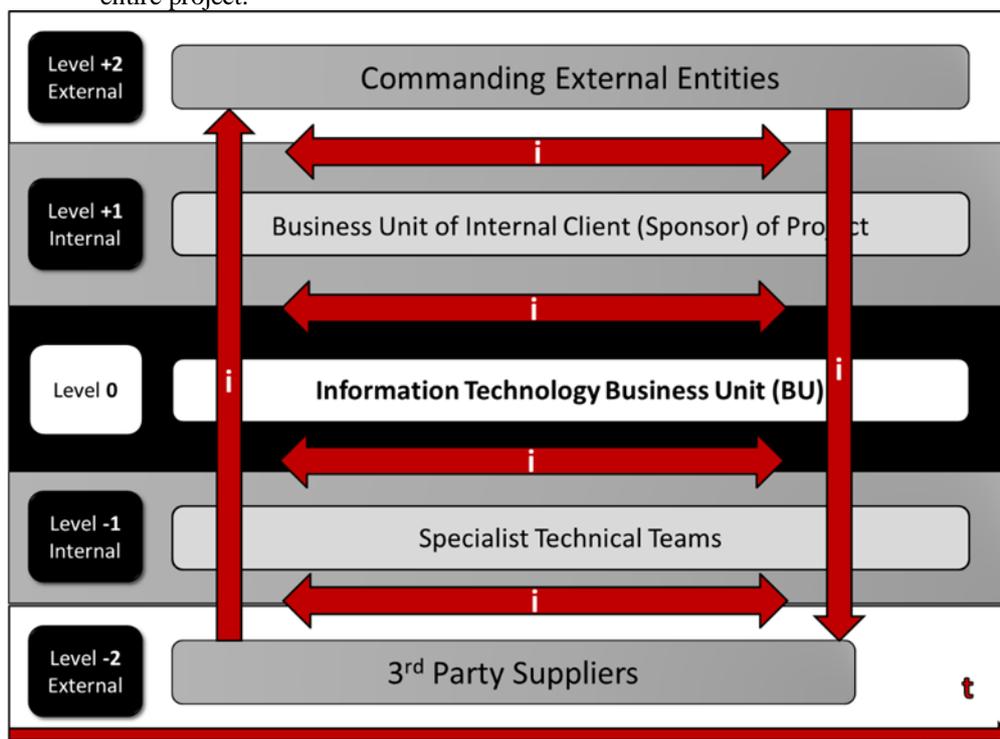


Figure 4: MLM - Governance as the flow of info according to agreed requirements.

The reader should note at this point that similar ideas are already followed to some extent in practice, which may well be the case. This idea is yet to be developed to its potential, though. It is important to be able to standardise such an approach so that it may be replicable, measured, improved and adapted (Laufer, Hoffman, Russel, & Cameron, 2015).

The MLM enables the maximum freedom in the delivery of the different portions of the project, while maintaining transparency, integration and governance.

4. Assumptions and requirements for successful use of MLM

There are aspects of project delivery that can be controlled, that can be managed deterministically. There are other aspects of delivery that can only be monitored. For aspects that can only be monitored, the information that is required to enable successful monitoring needs to be established and agreed. Apart from the producing the information for monitoring as agreed and delivering its contribution to the project as committed to, the deliverer of a unique portion of the project could be granted freedom, within bounds, in choosing the preferred approach to delivery. It is not productive to seek to control functions that can only be monitored.

The amount of freedom that can be granted to the leader and team responsible for the delivery of a unique portion of the project depends on the maturity of the leader and the team. A highly experienced and skilled team could benefit from delivering its portion subjected to the minimum interference. A less experienced and skilled leader and team could benefit from more rigid structure and guidance.

When customizing the PMM for an individual project, the required info flow between levels and the minimum governance requirements are to be established and agreed as early as possible.

It is clear that the role of the project manager (PM), would be that of a cross-functional integrator for the entire project. This role would demand a good knowledge of the characteristics of all portions of the project and of the levels where they are delivered, of the teams responsible. This role would require understanding for how a factor at t1 at level +1 may impact level -1 at t2. Not all IT PMs are suitable for this role. It would be suggested that a role for the cross-functional integrator should be created and filled by a suitable project stakeholder. This role could be filled by the IT PM, if this person is suitable and if the PMt environment is mature enough to not reduce the IT PM to a de facto project administrator. If this is not possible, a suitable candidate can be chosen from existing project stakeholders or resourced and added to the team. This is illustrated in Figure 4.

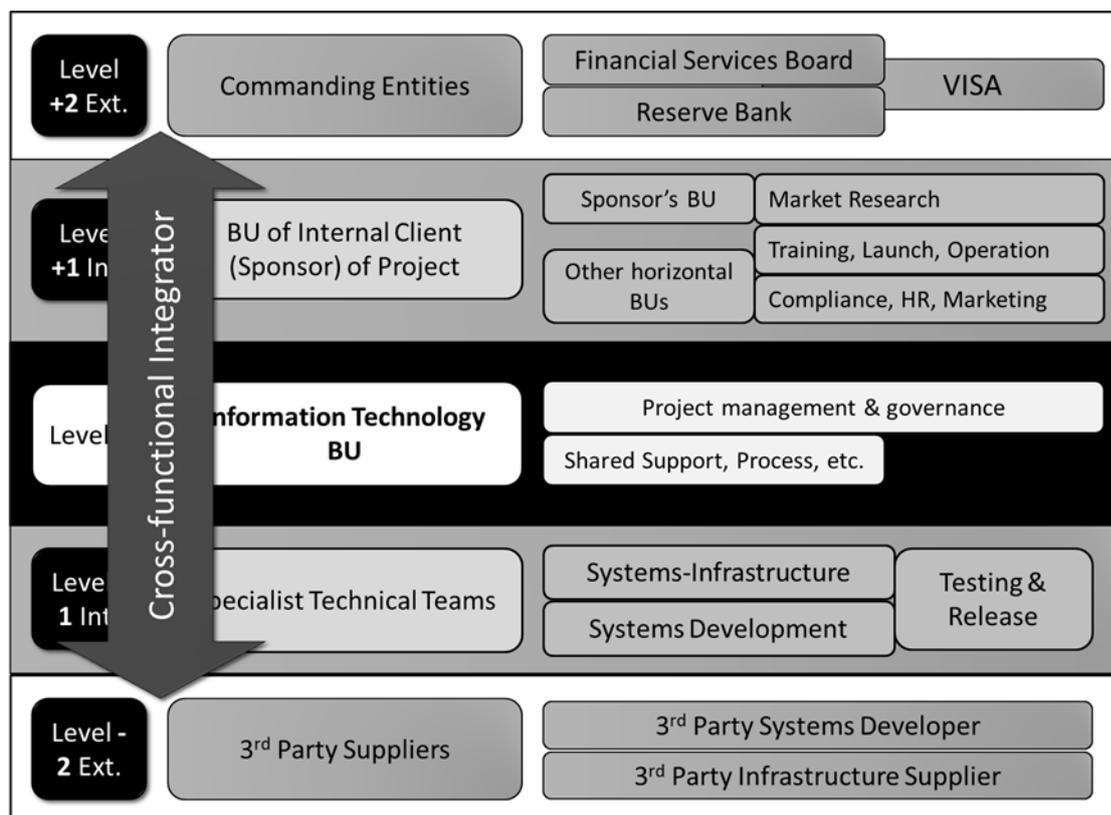


Figure 5: Cross-functional Integrator

Referring back to a statement made earlier with regards to Figure 3 and Figure 4, it would be valid to ask why organisations would desire for these processes to be formalised if there are similarities to how project management already occurs, would the organisation's own approach to managing the multi-faceted project not be seen as a competitive advantage to be protected? The counter is that the pluralism of open scientific societies induces further competitiveness and breakthroughs, whereas 'closed' organisations are often caught in the specialisation trap (Popper, 1945) (Knudsen, 2003).

5. The Methodology Customisation Framework

The Methodology Customisation Framework (MCF) was created by analysing some of the most popular methodologies currently being used for formal project management in large technology organisations. Amongst the characteristics of different PMMs, the following are found:

- i. Some characteristics are mutually exclusive.
- ii. Some characteristics are mutually inclusive.
- iii. Some characteristics are interchangeable.
- iv. Some characteristics are found across multiple PMMs, differentiated only by semantics and/or perspective.

The MCF enables the comparison of the characteristics of different PMMs. PMMC is aided by listing and describing mutually exclusive, mutually inclusive, interchangeable and similar characteristics. The MCF aids the selection of a base PMM. The MCF allows for the reinforcement of the selected base PMM through the addition of desired, harmonizable characteristics taken from other PMMs. The MCF enables the creation of integrated HPPMs by allowing for disparate portions of the project to be delivered by following unique, function-specific PMMs.

These proposed capabilities of the MCF seeks to improve the freedom by which unique teams can deliver their functions to the project, while maintaining the adequate integration of all streams of delivery. This improved freedom is expected to enhance delivery as measured against the triple constraint of PMt.

The MCF allows for the formalisation and further development of practices that already exist in and undefined approaches to PMt identified in the industry. Once formalised, the effects can be measured and improved. The use of the MCF is explained further on by means of a hypothetical project.

PMt literature has developed disjointedly in general, and publications with regards to PMMs are no exception. Across the vast BOKs (not limited to the PMI's PMBOK) relating to PMt, well-known compositions, such as Prince2 or DSDM or Scrum or ISO 15288 and 24748 are defined as standards or approaches or methodologies or guides. Irrespective of significant differences that surpass the semantics, apples-to-pears comparisons are frequently made. Whereas, for example, the PMBOK cannot be readily compared to DSDM in their totalities, though at certain levels of detail comparisons can be made between related processes or principles proposed in both the guide (PMBOK) and the framework (DSDM).

For simplicity, all of the above will be referred to as PMMs in this paper, however, the distinctive characteristics are understood and employed and maximised so as to produce useful outcomes.

Philosophically, Traditional and Agile methodologies can be juxtaposed. Since Agile is decades old, 'Traditional' will rather be referred to as 'Waterfall', implying the original analyse-design-build-test-implement high-level lifecycle sequence. A choice can be made to follow one or some hybridisation of both.

6. An example of using the Methodology Customisation Framework

For the following example the dynamic software development method (DSDM), the PMBOK, Prince2 and ISO 15288 & 24748 will be used. These are respectively referred to as a framework, a guide, an approach and a standard. At the project lifecycle level, they propose the following:

PMBOK – Starting the project; organising and preparing; carrying out the project work; and closing the project (PMI, 2013). This is illustrated in Figure 1.

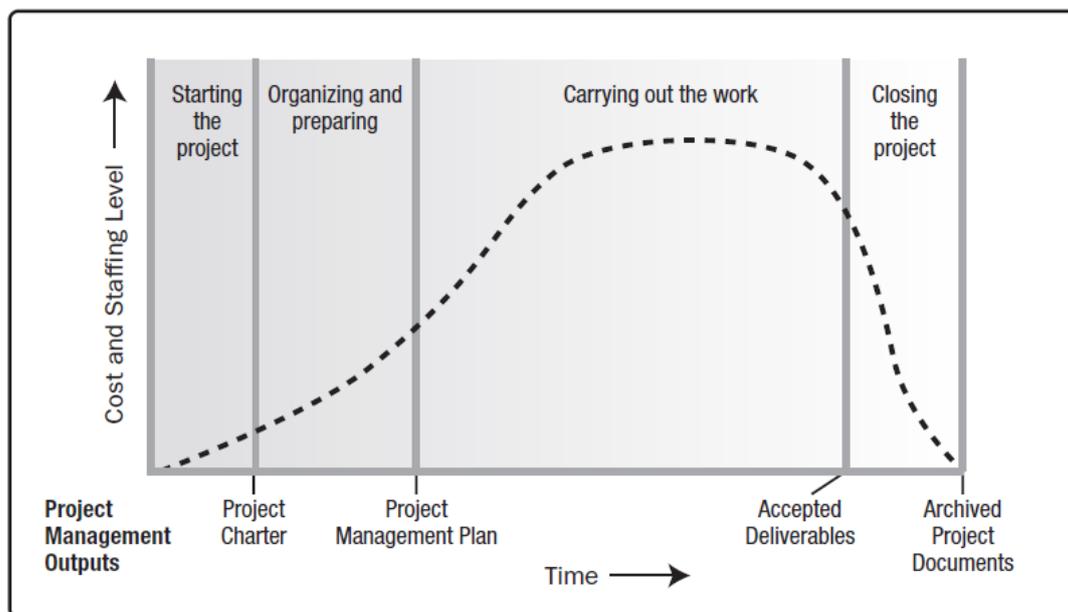


Figure 6: The PMBOK project lifecycle [PMBOK 5th Ed: 39]

Prince2 – Starting up a project; initiating a project; controlling a stage; managing a stage boundary; and closing a project (AXELOS, 2017). This is illustrated in Figure 2.

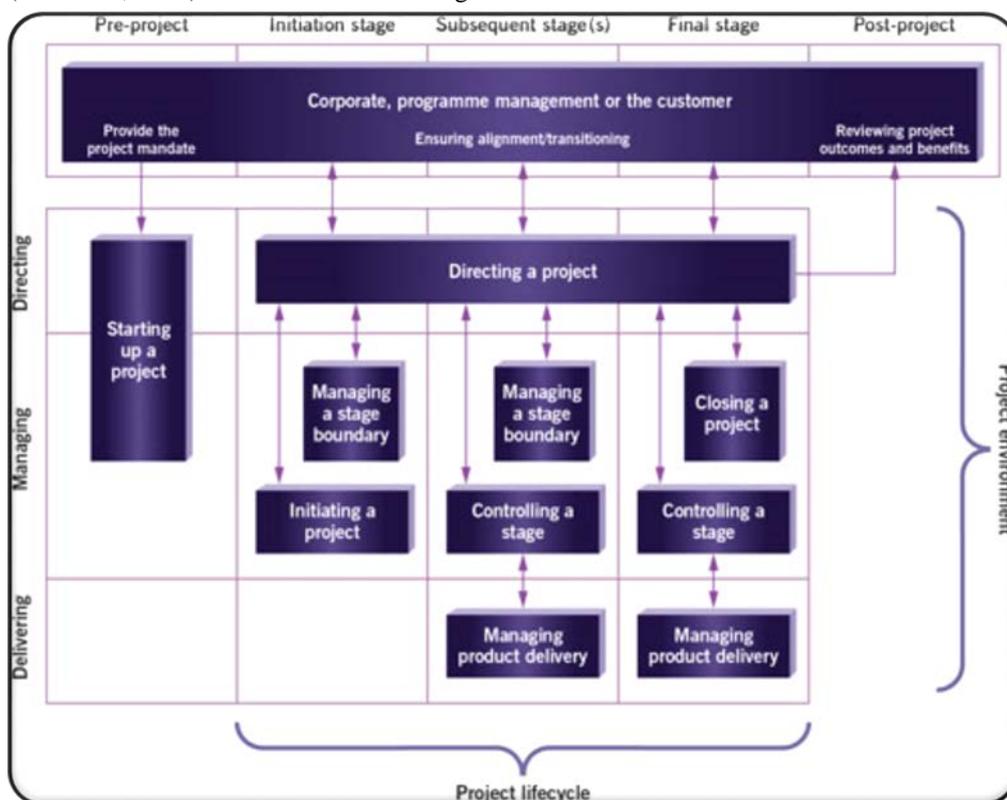


Figure 7: Prince2 Lifecycle (AXELOS, 2018)

ISO – Standards are proposed that the lifecycle should adhere to (ISO/IEC, 2008).

DSDM – Pre-project; an iterative feasibility foundations, exploration, engineering, and deployment stage; and post-project (DSDM Consortium, 2013). This is illustrated in Figure 3.

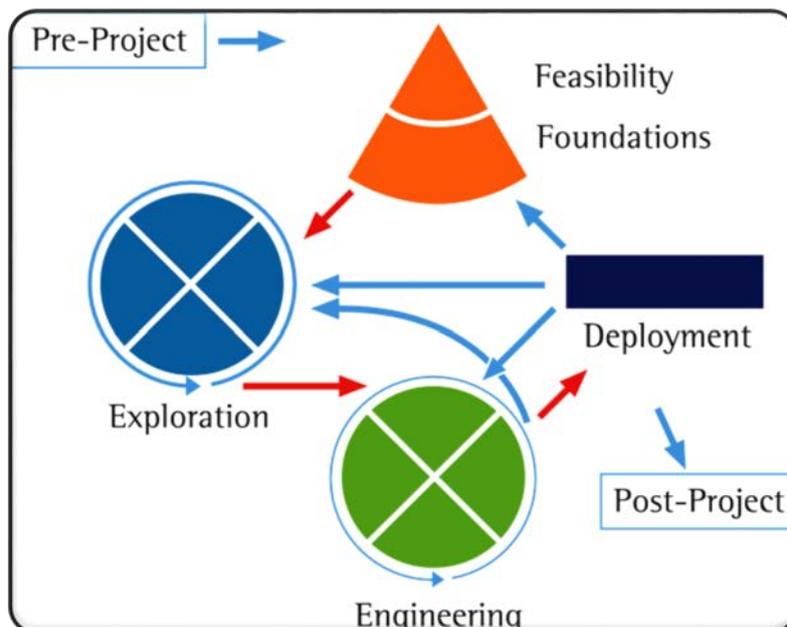


Figure 8: The DSDM Lifecycle (DSDM Consortium, 2013)

The choice for a base-PMM is between the waterfall-type PMBOK and Prince2 lifecycle and the agile DSDM; the standards proposed by ISO can be used to bolster the selected lifecycle.

For choosing between waterfall and agile for the basis of a PMM, the following fundamental questions are proposed as a point of departure:

- i. When must a waterfall PMM be followed?
- ii. When can a waterfall PMM be followed?
- iii. When must an agile PMM be followed?
- iv. When can an agile PMM be followed?

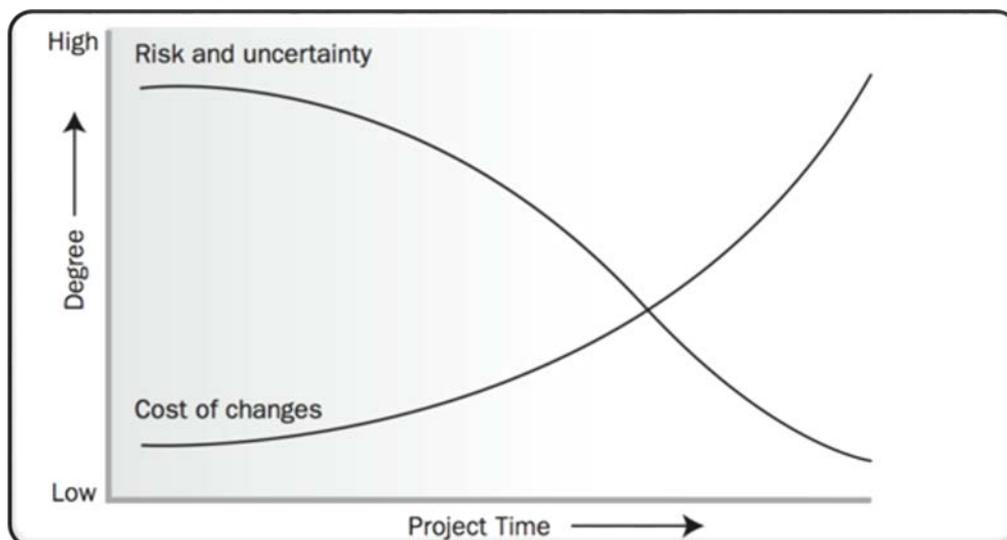


Figure 9: The cost of project changes over time (PMI, 2013)

The following is suggested with regards to these questions:

- i. A waterfall PMM must be followed when the cost of design changes becomes prohibitively expensive from an early stage on the project (Benington, 1983).
- ii. A waterfall PMM can only be followed when a requisite minimum set of requirements can be determined and agreed before the main stage of the project ensues.
- iii. An agile PMM must be followed when the minimum set of requirements of ii cannot be determined before the main stage of the project.
- iv. An agile PMM can only be followed when iterative delivery and continual reprioritisation of requirements are possible without incurring prohibitively costly expenses.

An agile prototyping and/or exploratory mini-project is proposed if these questions cannot be answered, in order to determine the answers for these questions. Then a choice between either can be made or a hybrid can be synthesised from both and reinforced by applying the ISO standard.

The project for this example is assumed to be a complex banking project, which would include an IT component, a marketing component and a training component. Upon analysis of the requirements and comparing the attributes of shortlisted PMMs, the Steerco, in conjunction with subject matter experts, selects the Prince2 lifecycle. The overarching philosophy for the greater project, in this case, is waterfall. Irrespective of the choice taken here, the project would be subjected to the project management office's (PMO) and greater organisation's governance and compliance requirements. In harmony with the organisation's governance requirements, the steerco agrees on a lean governance structure regarding the type of information required and the interval at which it should be supplied in order to enable adequate directing of the project.

The attributes of Prince2 execution of a project can now be scrutinised. If found lacking, the *Initiate a Project* process group can be reinforced with mutually inclusive elements of the PMBOK *Planning* Process Group. The PMM under construction can be sense-checked against the ISO standard. This is repeated until an adequate synthesised PMM has been produced, as is indicated in Figure 5.

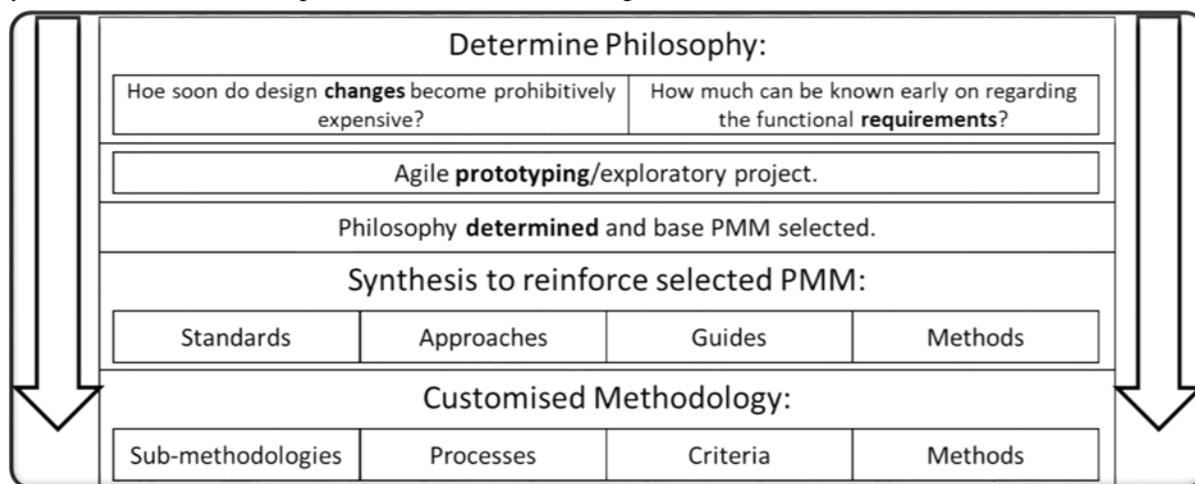


Figure 10: Methodology Customization Framework

The question then turns to the idiosyncratic functions delivered by the IT, training and marketing portions of the project. Should the entire initiative be managed as a single project? There could be advantages in doing so with regards to maintaining integration and traceability between the different streams. If it is decided to manage all effort under the umbrella of a single project, does the delivery of all functions need to be subjected to the same methodology? It is proposed that different methodological can be applied to the different portions, as illustrated in Figure 6.

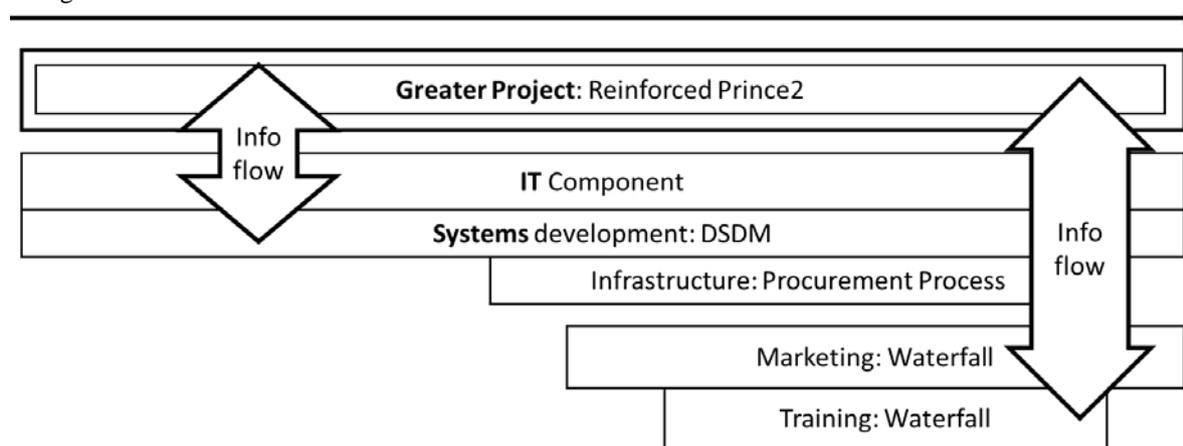


Figure 11: Customized Hybrid PMM

Enabling each stream to follow an optimised style of delivery is expected to improve the delivery of the unique portions of a project as measured against PMT's triple constraints. While maintaining the management of the entire initiative as one project, integration and governability is maintained.

The lean governance that the steerco agreed on is known. This lean governance, signified by the information flow in Figure 6 enables the PM to control the functions that can be controlled efficiently, and it enables the PM to monitor other progress. Similarly, the agreed governance allows the steerco to monitor progress and allows for

the project to adhere to organisational governance and compliance. Keeping to these agreements, the individual teams enjoy the freedom to follow to follow the PMM that optimally cater for their requirements. In this example the Systems Development (SD) component of the IT portion follows agile DSDM to deliver its part of the project, IT Infrastructure follows the procurement process and Marketing and Training prefers to deliver their portions following a traditionally sequenced approach.

7. Conclusion - Validation of the MLM and MCF

The MLM and MCF have been subjected to three initial validations. A research proposal of which the MLM and MCF forms part has been approved by a panel of industrial engineering academics in 2017. The MLM and MCF has been vetted by a limited group of professionals in the environment of large banks that range from business analyst with post-graduate engineering qualification, to senior business consultant with MBA degree, to business unit executive. The ideas behind the MCF has been introduced to the Cape Town chapter of the PMI. The value and usefulness of the MCF has been clear to all groups and valuable critique has been gathered and applied. The MLM and MCF will be presented at IEOM South Africa 2018 and thereafter, taking all feedback into consideration, the MLM and MCF will be finetuned and subjected to case study and peer-review through 2019.

Validation by peer review seeks to test the theoretical adequacy of these propositions against existing PMt theory, management theory and systems theory. There is a need to enhance pluralism in PMt theory (Soderlund, 2011) and it would be worthwhile to test the outcomes against the goal of pluralism too. Therefore, the study will make specific reference to Soderlund's schools of PM research and the approaches to PM research (Blomquist, Hallgren, Nilsson, & Soderholm, 2012).

Validation in practice through case study is aimed at answering two unassuming, but most important, questions: Is the value, the benefit to the project environment, evident? Are the MLM and MCF simple enough to be usable? Usability is paramount and a current problem with PMt research is not that there is a lack of theory, but rather a lack of readily usable theory (Laufer, Hoffman, Russel, & Cameron, 2015). Project stakeholders across the organisational hierarchy will be introduced to these propositions in answering the two questions.

While validating in large banks, the question will also turn to the current shortcomings experienced in dealing with 3rd party suppliers during projects. When validating with 3rd party suppliers, the question will also turn to the shortcomings in direction received from large banking clients.

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8. Biographies

M.T. Steyn de Wet is a research student at the department of Industrial Engineering, Stellenbosch University, South Africa. He earned a bachelor's degree in economics at Stellenbosch University, and a Master of Science degree in finance from the Centre for Financial and Management Studies at the University of London, UK. He has worked in the IT and operational environments at various banks, including South African banks, other African banks and off-shore banking in the United Kingdom. He has worked as a project manager, as a consultant on business transformation programmes, in the training and development of project resources and delivered various functions in project management offices. His research interests include project management methodology optimisation, the optimisation of the project management office and technology project management in general.

Corne Schutte is the head of Industrial Engineering at Stellenbosch University. Specialties: air force, application development, asset management, call centre, innovation, knowledge management, logistics, management, performance management, personnel, process engineering, program management, project management, research, simulation, software development, strategic planning, system architecture, web site production.

Wynand van Dyk is as a Professor in the field of Engineering in the Department of Industrial Engineering at Stellenbosch University, South Africa. His research interests are aimed at understanding what makes certain organisations more resilient/sustainable than others and to understand why certain projects are more resilient than others.