

Development of a project portfolio management model for executing organisational strategies: A normative case study

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ABSTRACT

This research study is a normative case study to develop a portfolio management model for a State Owned Enterprise in South Africa to effectively implement and embed portfolio management best practices. The implementation of the recommendations resulting from this research will improve the maturity of portfolio management processes and contribute towards the State Owned Enterprise becoming a high agile organisation by ensuring that projects and programmes align to the strategic objectives to deliver the required strategic results. The research study also expands the theory/body of knowledge on portfolio management models and the steps to be followed to successfully implement and embed portfolio management best practices. The portfolio management model and the implementation steps can be used by other organisations as a blueprint for implementing portfolio management best practices.

KEYWORDS: qualitative research, normative case study; organisational strategy execution; portfolio management model; portfolio management best practices, portfolio management implementation steps

INTRODUCTION

The purpose of research in science of engineering and technology management is to provide theoretical knowledge and practical techniques to better manage technology-based organisations to shape and accomplish strategic and operational objectives (Adapted from Buys, 2014)

Various research studies show that organisations struggle to bridge the gap between strategy formulation and its day-by-day implementation (PMI, 2014a & b; Morris and Jamieson, 2004; Sull, Homkes, & Sull, 2015). These studies also show that organisations are not effectively implementing and applying portfolio management best practices to achieve strategic results. Portfolio management helps organisations to manage the multitude of simultaneous projects and programmes ongoing in the organisation. Implementing and embedding portfolio management best practices ensure that the “right” projects and programmes that collectively make the greatest contribution to an organisation’s strategic objectives are selected and the “wrong” ones are stopped.

The key focus of the research study was to develop a portfolio management model that can be applied to implement and embed portfolio management best practices in a State Owned Enterprise (SOE) in South Africa. Proper implementation and embedment of portfolio management best practices will enhance effective decision-making to select, categorise, prioritise, optimise and balance, authorise, plan and manage the right projects and programmes and allocate the limited resources (e.g. funds and manpower) available to deliver strategic results

effectively and maximise business value. A survey conducted by the researcher to establish the current state of portfolio management in the SOE revealed the following results:

- 68.4% of the respondents agreed that the SOE's strategic objectives are adequately defined in order to align all programmes and projects to these strategic objectives. 26.3% of the respondents disagreed, and 5.3% were unsure.
- 47.4% of the respondents agreed that all programmes and projects are aligned to the strategic objectives. 31.5% of the respondents disagreed, and 21.1% were unsure.
- 47.4% of the respondents disagreed that executive and senior management take accountability for portfolio management. 42.1% of the respondents agreed, and 10.5% were unsure.
- 68.4% of the respondents disagreed that the culture in the organisation actively supports effective portfolio management. 21.1% of the respondents agreed, and 10.5% were unsure.
- 73.7% of the respondents disagreed that portfolio management governance, portfolio management structures, roles and responsibilities are clearly defined. 26.3% of the respondents agreed, and 0% was unsure.
- 89.4% of the respondents disagreed that the SOE has adequate portfolio management capacity and capability. Only 5.3% of the respondents agreed, and 5.3% were unsure.
- 57.8% of the respondents disagreed that the standardised portfolio management practices/processes are adequate. 21.1% of the respondents agreed, and 21.1% were unsure.
- 94.7% of the respondents disagreed that the standardised portfolio management practices/processes have been successfully rolled out and embedded. Only 5.3% of the respondents agreed, and 0% was unsure.
- 89.5% of the respondents disagreed that the standardised portfolio management practices/processes are effectively applied. Only 10.5% of the respondents agreed, and 0% was unsure.
- 63.2% of the respondents disagreed that there is effective collaboration between all functions involved in portfolio management to ensure that the strategic objectives are achieved. Only 10.5% of the respondents agreed, and 26.3% were unsure.
- 68.4% of the respondents disagreed that the portfolio management solution and IT support are adequate to support portfolio management. Only 10.5% of the respondents agreed, and 21.1% were unsure.
- 68.4% of the respondents disagreed that all projects and programmes are properly justified, benefits identified and managed, and business value verified to ensure achievement of strategic results. 21.1% of the respondents agreed, and 10.5% were unsure.

The following research question was formulated based on the challenges the SOE are experiencing to implement its organisational strategies and objectives through the application of effective portfolio management:

What steps should be followed to implement and embed portfolio management best practices to successfully execute the strategies as outlined in the SOE's Corporate Plan?
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Answering the research question resulted in the development of a detailed portfolio management model for the SOE as well as key recommendations and steps to implement and embed portfolio management best practices.

RESEARCH DESIGN AND METHODOLOGY

The research model selected for this research study was a normative study as adapted from Routio (2007) - see Figure 1.

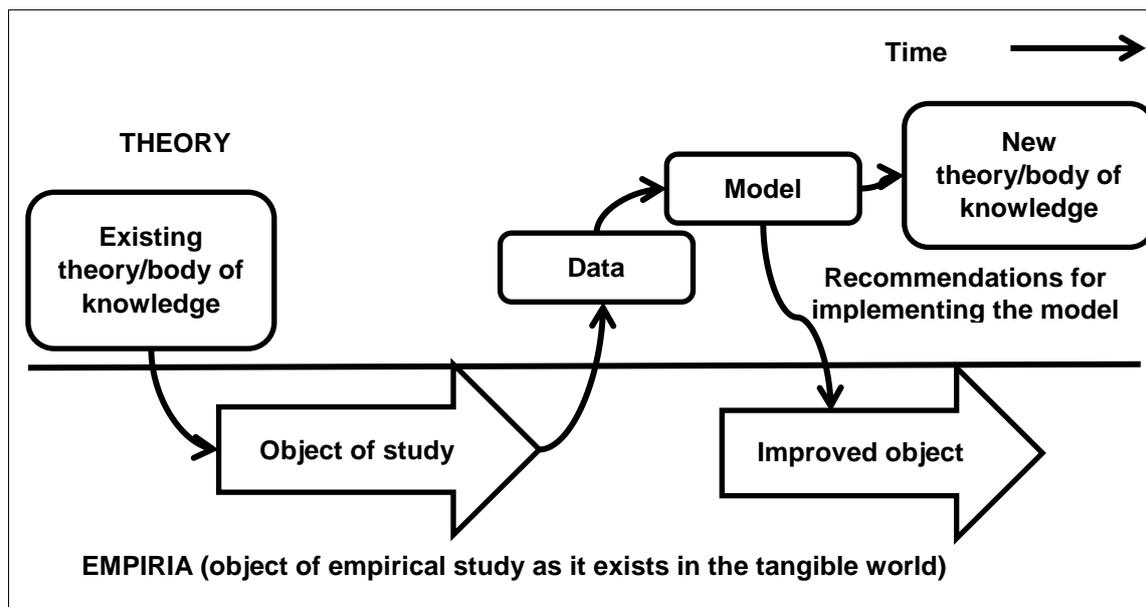


Figure 1: Normative study design (Source: Adapted from Routio, 2007)

Routio (2007) clarifies that in a normative study the study proceeds simply by enlarging an earlier model. The existence of a tentative model helps in selecting the logical structure of the entire research study and planning it. The model helps the researcher to decide which material has to be collected, from which cases or specimens and about which attributes or variables of these cases.

A phenomenological philosophy (position) was adopted. The phenomenon that was studied is portfolio management i.e. the development of a portfolio management model and the steps (i.e. activities, roles and responsibilities, processes, tools and techniques, etc.) that must be followed to implement and embed portfolio management best practices in order to successfully execute the strategies as outlined in the SOE's Corporate Plan.

A qualitative, applied, deductive and inductive research approach was followed. A deductive approach was used by developing a tentative portfolio management model from the current theory/body of knowledge on portfolio management (i.e. developing a proposal). The tentative portfolio management model was then used as the basis for developing a tentative portfolio management model for the SOE (i.e. proposal) by analysing and integrating the current SOE's processes, key roles and responsibilities, tools and techniques, templates, etc. into the tentative portfolio management model developed from the theory/body of knowledge. The tentative portfolio management model for the SOE was then discussed, reviewed and revised during one-

to-one and group interviews to develop a final portfolio management model for the SOE by following an inductive approach (i.e. assessing the proposal and developing a final proposal).

A normative case study was selected as research strategy and methodology. Yin (2003) clarifies that a case study as a research strategy comprises an all-encompassing method - covering the logic of design, data collection techniques, and specific approaches to data analysis. Routio (2007) clarifies that a normative study aims at finding out not only “how things are”, but above all “how they should be”, which means that it will be necessary to define the subjective point of view that shall be used, in other words to select the people who shall evaluate the proposal which aim at improving the object of study. Routio (2007) mentions that normative studies often deal with complex practical problems and says that optimally a normative research study proceeds through the following successive stages:

1. Evaluation of the initial state and defining the need for improvements.
2. Analysis of relationships and possibilities to change things.
3. Synthesis: proposal for improvement.
4. Evaluation of the final state.

The process followed in this normative case study is shown in Figure 2.

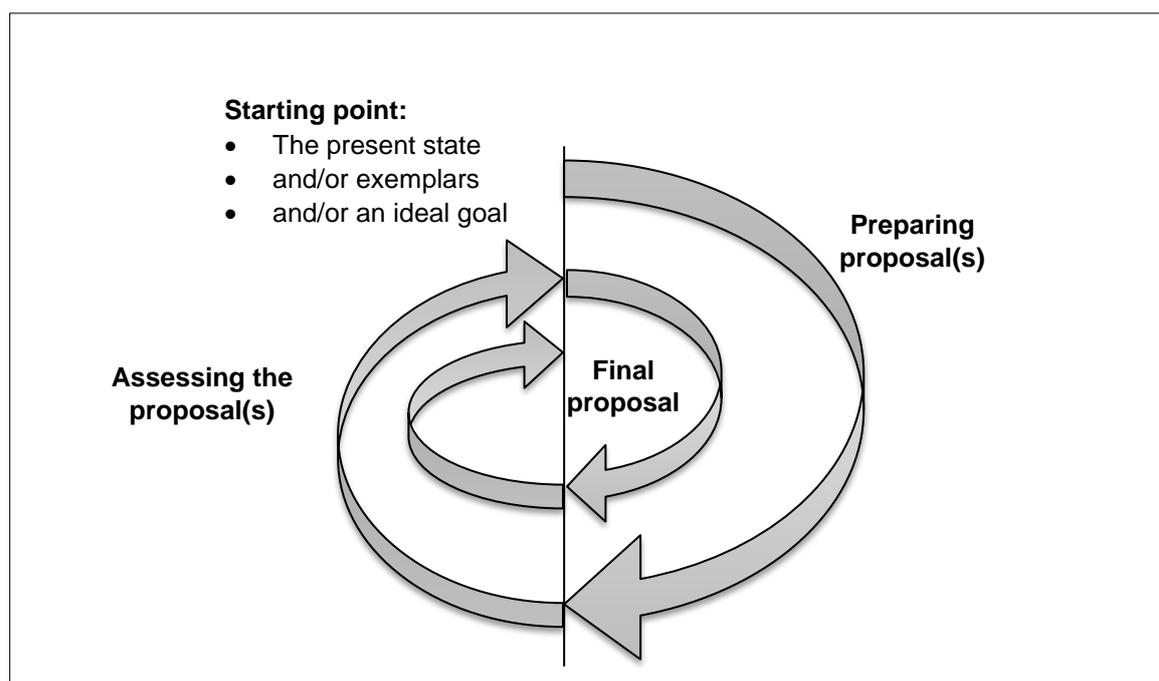


Figure 2: Process for normative case study (Source: Routio, 2007)

THEORETICAL BACKGROUND

Literature was reviewed from international standards and guides, journals, publications, research articles, reports, white papers, etc. from bodies and reputable organisations such as the British Standards Institution (BSI), Project Management Institute (PMI), Office of Government Commerce (OGC), Association for Project Management (APM), IPS Learning and Stanford

Center for Professional Development, TenStep Inc., etc. The literature review included the following topics:

- Introduction to portfolio management.
- Portfolio management strategic context and sustainable development.
- Portfolio governance and key functions involved in portfolio management.
- Business value and benefits management.
- Portfolio management standards, models, frameworks and best practices/processes.
- Portfolio management process tools and techniques.
- Portfolio management solutions/systems.
- Implementation of portfolio management in an organisation.

The development of a tentative portfolio management model (i.e. preparing a proposal) was deduced by integrating the summaries and conclusions of the first six topics of the literature reviewed. Key recommendations and detailed steps to implement and embed portfolio management best practices were deduced from integrating the summaries and conclusions of the last two topics mentioned above. Reference is made to the literature in the discussion of the key elements of the tentative portfolio management model that follows and the recommendations for implementing the final portfolio management model.

Tentative portfolio management model (i.e. preparing a proposal)

An iterative comparison and analysis of the associated steps/stages, processes/practices and domains of the portfolio management standards, models and frameworks (BS ISO 21504:2015; PMI, 2013a; OGC, 2011; Mochal, 2014b; IPS, 2013a–g; and Innotas, 2014) resulted in the development of the tentative portfolio management model shown in Figure 3 and the elements and activities shown in Table 1.

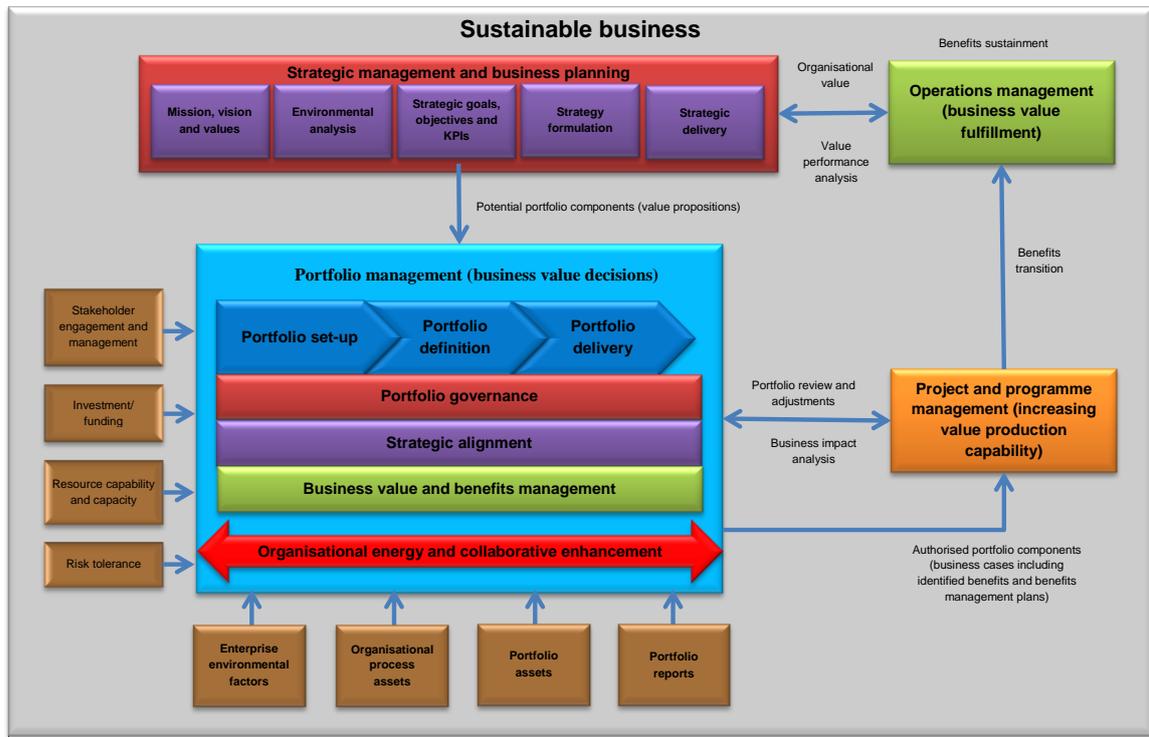


Figure 3: Portfolio management model

Table 1: Portfolio management model elements and activities

Portfolio set-up	Portfolio definition	Portfolio delivery
<ul style="list-style-type: none"> Establish portfolio governance and organisation structures. Develop portfolio strategic plan. Identify potential portfolio components and benefits and maintain the portfolio pipeline. Categorise potential portfolio components. Develop portfolio charter(s) and setup portfolio(s). 	<ul style="list-style-type: none"> Develop portfolio roadmap. Develop portfolio governance management plan. Develop portfolio change management plan. Develop portfolio performance and benefits management plan. Develop portfolio financial management plan. Develop portfolio resource management plan. Develop portfolio stakeholder and communications management plan. Develop portfolio risk management plan. Develop integrated portfolio management plan. Assess and select portfolio components. Prioritise portfolio 	<ul style="list-style-type: none"> Activate portfolio components. Manage portfolio changes. Manage portfolio performance and benefits. Manage portfolio finances. Manage portfolio resources (i.e. supply and demand). Manage portfolio stakeholders and communications. Manage portfolio risks. Provide portfolio oversight (i.e. management control). Report portfolio performance. Transfer benefits and allocate benefits accountability. Perform portfolio governance reviews.

Portfolio set-up	Portfolio definition	Portfolio delivery
	components. <ul style="list-style-type: none"> • Balance, optimise and maintain the portfolio. • Authorise portfolio and changes. • Create portfolio delivery plan. 	

The key elements of the tentative portfolio management model in Figure 3 are described in the paragraphs that follow.

Sustainable business (summarised from Labuscagne & Brent (2005)). In order for a business to remain competitive and be successful it must be sustainable. To achieve sustainable development objectives, organisations must align strategic management and business planning with the three objectives of sustainable development which are economic efficiency, social equity and environmental performance.

Strategic management and business planning (summarised from Arora (2015), Visser (2015), Mochal (2015), PMI (2013a), Shenhar *et al.* (2007), Morris & Jamieson (2004), Patanakul & Shenhar (2012), Kiisel (2010), and Sull, Homkes, & Sull (2015)). Mission is the purpose and priorities of an organisation to compete in a competitive business environment. Vision is an organisation’s highest aspirations and ideals for success and includes the goals, metrics and strategy that form the foundation for the organisation. A key criterion for vision is to achieve a competitive advantage with the focus on customers and competitors. Core values, behavior of the organisation and artefacts embodies an organisation’s culture. Organisations perform environmental analysis (internal and external) to establish strategic goals and objectives. Strategic goals set direction to obtain a competitive advantage. The most pressing issues in creating a competitive advantage in a volatile business environment are innovation, human capital and global expansion. Strategic objectives are specific results to be achieved in a given time period and include targets and measures (KPIs). Strategic objectives must be written in a way that they are understandable and worded according to the SMART technique (specific, measurable, attainable, realistic and time-bound) to facilitate the development of project objectives that align to organisational goals and strategies. Strategy formulation establishes a roadmap to enable long term organisational decisions and includes policies, directives, plans and actions for achieving strategic goals and objectives, either through operations (on-going organisational activities) or programmes and projects. Effective strategy delivery requires a suitable organisational structure and system to react more quickly to external and internal shifts and supports the implementation of projects and programmes. To ensure success organisations need to empower management and staff with the tools, resources and insights to execute their strategies consistently and reliably in the midst of continuous business change. Organisational objectives and strategies determine the potential portfolio components that should be addressed and prioritised to deliver value/benefits for the organisation. Value propositions are used as the basis for selecting potential portfolio components and describe the work and benefits that must be delivered. Adequate strategic and operational controls must be in place to track strategy implementation, detect problems or changes and make adjustments.

Portfolio management (summarised from PMI (2008 and 2013a), BS ISO 21504:2015, Mochal (2014a & b), OGC (2011), and Shenhar *et al.* (2007)). Portfolio management is the bridge between organisational strategy, programme and project management, and operations. Portfolio management is a systematic and continuous decision-making process by which an organisation evaluates, selects, and prioritises the work that is of the most value taking into consideration the allocation of scarce resources (financial, physical, human, technological) to best accomplish organisational objectives and strategies consistent with the organisation's vision, mission and values. Business cases are used as the basis for evaluating, selecting, prioritising and approving portfolio components (programmes, projects and other work) that will provide the maximum value/benefits for the organisation. Only projects and programmes that are aligned to strategic goals and objectives should be authorised for implementation. Effective portfolio management is a major success driver for delivering more projects on-time, on-budget, and meeting their original business intent and forecasted ROI. Portfolio management thus should be elevated to a strategic level. Four possible strategic focusses for linking portfolio management, programme and project management to business strategy are cost advantage, customer focus, product advantage, and time advantage.

The portfolio management model elements and associated processes/practices/activities and their descriptions that follow are the result of an iterative comparison and analysis of the detail of the associated steps/stages, processes/practices or domains from the portfolio management standards, models and frameworks. The purpose of *portfolio set-up* is to evaluate the organisation's strategic objectives and strategies, develop a portfolio strategic plan, establish portfolio governance and organisation structures, identify and categorise potential portfolio components and their benefits, and setup portfolios to deliver the strategic objectives. The purpose of *portfolio definition* is to plan, assess and select, prioritise, balance and optimise, and authorise the portfolio and portfolio components for execution which will deliver the greatest contribution to the strategic objectives, subject to consideration of risk/achievability, resource constraints and cost/affordability. The purpose of *portfolio delivery* is to manage the execution of the portfolio and its authorised components in line with the portfolio management and delivery plans and to ensure that the delivery of benefits is transferred to operations in order to achieve the strategic objectives. Portfolio management inputs include:

- *Stakeholder engagement and management.* Stakeholders involved in portfolio management must be identified and engaged in portfolio management. Stakeholders may include those involved in executive management; strategic and business planning; investment and finance management; portfolio office; portfolio management, programme and project management; operations, etc. Engagement is a clear demonstration that an organisation is funding the right projects that will further the strategy.
- *Investment/funding.* The selection, prioritisation and authorisation of portfolio components (programmes, projects and other work) are subject to investment approval and the availability of funding.
- *Resource capacity and capability.* The selection, prioritisation and authorisation of portfolio components must take into account the available resource capability and capacity.
- *Risk tolerance.* The evaluation and selection, prioritisation and authorisation of portfolio components must also take into account the organisation's tolerance to risk.

- *Enterprise environmental factors.* Enterprise environmental factors are internal or external conditions, not under the control of the portfolio organisation, which influence, constrain, or direct a portfolio's success.
- *Organisational process assets.* Organisational process assets are plans, processes, policies, procedures, and knowledge bases, specific to and used by the performing organisation that can be leveraged by the portfolio manager.
- *Portfolio process assets.* Portfolio process assets are formal and informal plans, policies, procedures, guidelines, portfolio related knowledge bases, such as lessons learned and historical information. It may also include information on tools, techniques, models, integrated schedules, and risk and performance data.
- *Portfolio reports.* Portfolio reports include reports such as performance reports, feedback reports to organisational strategy and business planning, variance reports, resource capability and capacity reports, portfolio risks and issues, governance recommendations and decisions, and portfolio component recommendations.

Project and programme management (summarised from PMI (2013a), OGC (2011), Mochal (2014a), Shenhar *et al.* (2007), Morris & Jamieson (2004), and Patanakul & Shenhar (2012)). Project and programme management are disciplines for managing the capacity to deliver business value. Programme management harmonises its project and programme components and controls interdependencies in order to realise specific benefits. Project management develops and implements plans to achieve a specific scope that is driven by the objectives of the programme or portfolio. Projects must be treated in a strategic way to ensure strategic alignment with organisational strategies and sustainability. Project strategies must be developed to focus project teams on the strategic value of their projects and to get them to make decisions that support the strategic objectives. Projects must be selected based on their strategic impact and categorised accordingly (e.g. operational projects, strategic projects, external projects, and projects for internal customers). Resource allocation among the categories must be based on expected impact from each category in the organisation, current strategies, infrastructure needs, etc. The criteria for individual project selection must be based among other things on risk and opportunity, difficulty, and existing resources and skills. To create a competitive advantage a project strategy must be developed prior to developing the project management plan. A project strategy involves the following seven elements namely business perspective, objective, product definition, competitive advantage/value, success and failure criteria, project definition, and strategic focus.

Operations management (summarised from Visser (2015), and PMI (2013a)). It is in operations management where delivery of value is realised through day-to day processes. After the completion of programmes and projects, benefits are transitioned to operational areas to ensure continued realisation of the benefits (i.e. sustainment of benefits). Transition is the ultimate measure of success, where the results of project-based work are moved into the mainstream of the organisation's operations.

Portfolio governance (summarised from Bourne (2012 & 2014a & b), Too & Weaver (2014), PMI (2008, 2013a & 2015d), BS ISO 21504:2015, OGC (2011), Mochal (2014b), and APM (2011a & b)). There is often confusion about the difference between the functions of governance and management. The five functions of management are to: forecast and plan; organise; command or direct (lead); coordinate; and control. Good governance is achieved by integrating, coordinating and balancing the following six functions: determining the objectives of the

organisation; determining the ethics of the organisation; creating the culture of the organisation; designing and implementing the governance framework for the organisation; ensuring accountability by management; and ensuring compliance by the organisation. The implementation of a governance framework in an organisation consists of five main themes: governing relationships; governing change; governing the organisation's people; financial governance; and viability and sustainability. The governance of portfolios, programmes and projects is an integral part of the governing change theme. Portfolio governance is established by a governing body to make decisions about investments and priorities for the portfolio and ensures that portfolio management processes are followed to sustain the organisation. The effectiveness of governance is based on how well the organisation enforces current standards, policies and processes; and how well the organisation implements change. Effective governance must promote and support a culture of value, such that the organisation has a shared understanding what constitutes value for the organisation, clearly defined roles, responsibilities and accountabilities, processes and practices around value management, with active benefits and change management, and relevant metrics.

Strategic alignment (summarised from OGC, (2011)). Successful strategic execution requires tightly aligning the portfolio to the corporate strategy. Achieving alignment and maximising performance of project-based work is critical to successfully execute the strategies an organisation has identified to deliver on key initiatives. The strategic plan is a key interface between the governing body and the management with shared responsibility to develop an effective strategy for management to implement.

Business value and benefits management (summarised from APM (2011b, 2012, 2012a & b, and 2013), PMI (2013a & b, 2015e, 2016a & b), and OGC (2010)). Business value is defined as the entire value of the business, the total sum of all tangible and intangible elements and is created through the effective management of on-going operations. Through the effective use of portfolio, programme, and project management, organisations will possess the ability to employ reliable, established processes to meet strategic objectives and obtain greater value from their project investments. Benefits management is a key aspect in the delivery of the value. A benefit is an outcome of actions and behaviors that provides utility, value, or a positive change to the intended recipient. Benefits must be stated with clarity and in a measureable form in the business case before a project is authorised. Benefits themselves are normally only achieved after a project is completed in the operational phase of the deliverables. Value must be retained throughout the project life-cycle using risk management, an appropriate procurement strategy, and ensuring that on-going costs and schedules are in line with the original plan. The intended recipients of the benefits must be prepared for the resulting change to be able to sustain the incremental benefits through the completion of projects and programmes and beyond.

Organisational energy and collaborative enhancement (summarised from OGC (2011)). Organisational energy is the extent to which an organisation has mobilised the full available effort of its people in pursuit of its goals. It is the collective effort of the people and the effective management of that effort within the organisation that are the deciding factor on whether or not the strategic objectives are achieved. Organisational energy refers to a collection of critical organisational elements such as leadership, direction, management, motivation, well-being, effective communication, teamwork, skills and experience, all of which must come together in order to release the organisation's collective energy in the right direction. The demands of

increased agility in planning require more effective collaboration between all functions involved in portfolio management.

A high level summary of *key roles of stakeholders and functions* involved in portfolio management and the purpose of each role as shown in Table 2 was deduced from PMI (2013a & 2015d), OGC (2011), and Mochal (2014b).

Table 2: High level summary of key roles of stakeholders and functions involved in portfolio management

Key role	Purpose of each role (responsibility)
EXCO.	Accountable for the governance of the organisation. Responsible for the approval of the corporate plan, annual financial plan and portfolio budget.
Portfolio director.	EXCO member responsible for the portfolio strategy and providing clear leadership and direction.
Portfolio direction group.	Governance body where decisions about inclusion of initiatives in the portfolio are made.
Portfolio progress group.	Governance body responsible for monitoring portfolio progress and resolving issues that may comprise delivery and benefits realisation.
Portfolio management sponsor.	Person or group responsible for the implementation of portfolio management and for enabling success.
Strategic and business planning.	Function responsible for producing the annual corporate plan, strategic goals and objectives, and strategies.
Strategic portfolio management office/portfolio office.	Works closely with strategic and business planning and other functions involved in portfolio management to achieve the strategic goals and objectives. Responsible for centralisation of support for portfolios, programmes and projects and maintaining visibility and control on the performance and trends of the projects and programmes.
Business analysis.	Function responsible to identify business needs, elicit and manage requirements, and recommend relevant solutions to meet organisational needs.
Portfolio/programme/project management office (PMO).	Entity that defines and maintains the process standards related to project, programme and portfolio management.
Portfolio manager.	Person responsible for the execution of the portfolio management process with the focus on “doing the right work”.
Portfolio management team.	Team responsible for the efficiency and effectiveness of the internal running of the portfolio.
Portfolio benefits manager.	Person responsible for ensuring that a consistent approach to benefits management is applied across the portfolio.
Finance.	Function responsible for providing guidance for business case preparation, development of the annual portfolio financial plan and budget, tracking the actual spend in a year, and ensuring the realisation of financial benefits by adjusting budgets where appropriate.
Project sponsor	Person who owns the project business case and is responsible for

	agreeing the project objectives with the relevant stakeholders.
Programme and project management.	Function responsible for the management delivery of change initiatives (e.g. programmes and projects).

A detailed list of *portfolio management process tools, techniques, templates, etc.* was compiled from BS ISO 21504:2015, PMI (2013a), OGC (2011), and Mochal (2014b) and was listed and grouped according to the portfolio management steps/activities in Table 1 but is not documented in this paper. These process tools, techniques, templates, etc. can be applied when executing the activities of the portfolio management model.

DATA COLLECTION, ANALYSIS AND VALIDATION

Figure 4 outlines the process followed to develop a final portfolio management model for the SOE and to establish recommendations for implementing the final portfolio management model.

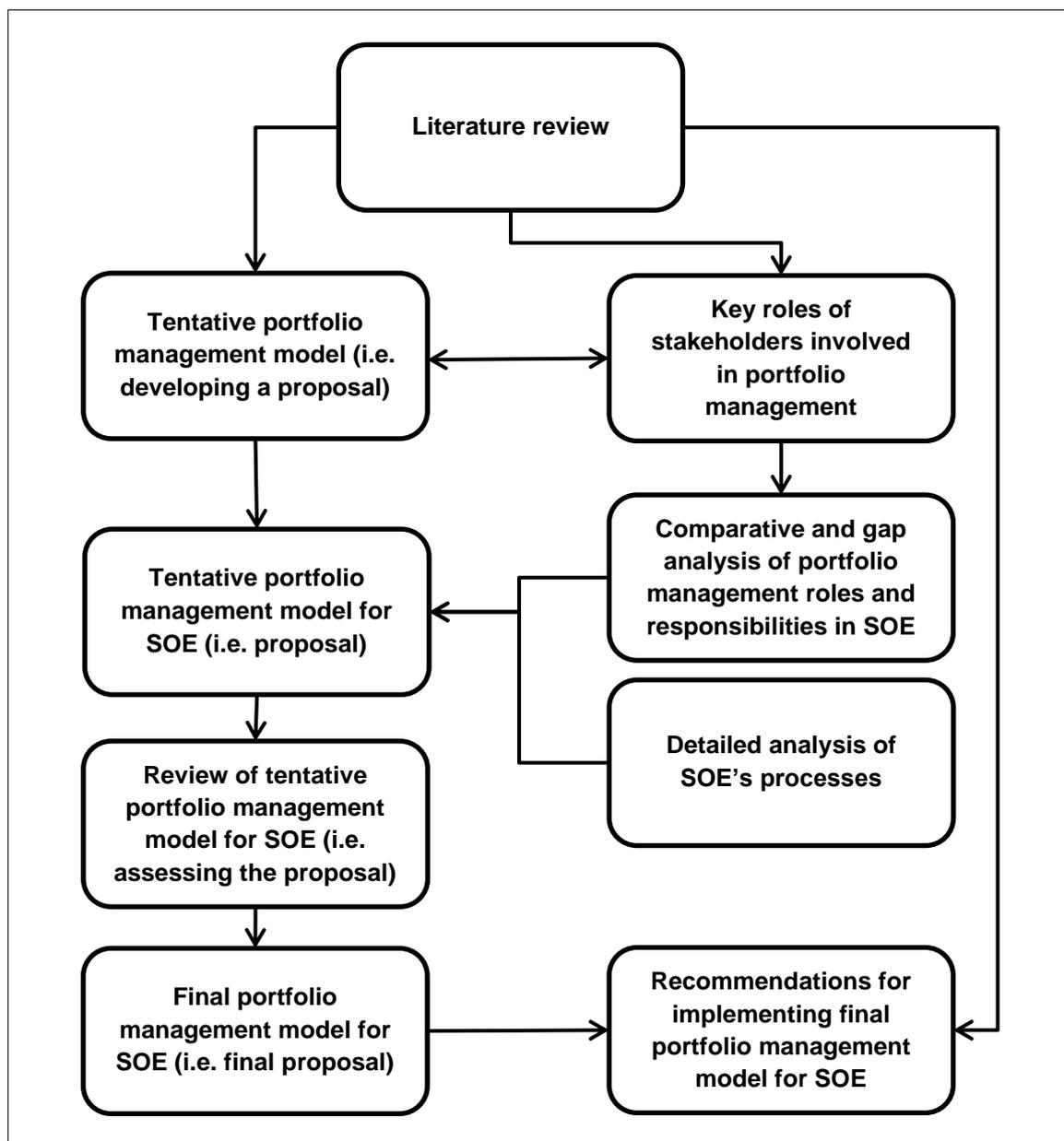


Figure 4: Process followed to develop a final portfolio management model for SOE and to establish recommendations for implementing the final portfolio management model

Tentative portfolio management model for SOE (i.e. proposal)

A tentative portfolio management model for the SOE (i.e. proposal) was developed by analysing and integrating the SOE’s processes; current roles and responsibilities, tools and techniques, governance documents, and templates related to portfolio management into the tentative portfolio management model developed from the theory/body of knowledge. The tentative portfolio management model for the SOE (i.e. proposal) was then used as the reference document to collect, analyse and record the data to develop a final portfolio management model for the SOE (i.e. assessing the proposal and developing a final proposal).

Nineteen respondents were selected and interviewed over a period of six months to review the tentative portfolio management model for the SOE (i.e. proposal) in order to develop and validate the final portfolio management model for the SOE (i.e. final proposal). The respondents were selected from executive/top management, senior management, middle management, and professionals/consultants from various Groups/Divisions/Subsidiaries and functions such as strategic management, finance, EPMO, portfolio management, programme and project management, operations, asset management, IT/system enablement, etc. The experience of the respondents in portfolio management varied from less than five years to more than 20 years.

The researcher was a full participant and facilitated the review of the tentative portfolio management model for the SOE during interviews. The tentative portfolio management model for the SOE was iteratively updated after agreement was reached on the changes proposed by the interviewees. The data collected during the review of the tentative portfolio management model for the SOE were referenced in a master record index and were stored electronically or in hard copy. The tentative portfolio management model for the SOE was validated by soliciting the participants' views of the credibility of the tentative portfolio management model for the SOE. During each one-to-one and group interview concerns were elicited and documented and next steps were established to address the concerns. The researcher managed and coordinated the close out of the next steps to ensure that all actions to address the concerns were resolved.

The tentative portfolio management model developed from the literature can also serve as an exemplar for other organisations to develop portfolio management models to suit them (i.e. transferable).

RESULTS

Final portfolio management model for SOE (i.e. final proposal)

The final portfolio management model for the SOE was documented in a detailed portfolio management model spreadsheet and manual. The portfolio management model spreadsheet and manual were authorised after validation and acceptance by the SOE's Portfolio Management Study Committee. The portfolio management model spreadsheet contains of the following sheets: a cover page, change log, portfolio management model (i.e. Figure 3), portfolio management model elements and activities (i.e. Table 1), high level summary of key roles of stakeholders and functions involved in portfolio management (i.e. Table 2) and the following detail for each step in the portfolio management model:

- Activity number, activity name, activity inputs, detailed activity description, and activity outputs.
- RACI, roles and responsibilities for each activity.
- SOE's Process Control Manuals (PCMs) applicable to each activity.
- Related SOE's governance documents, forms and templates applicable for each activity.

The details of the portfolio management model spreadsheet and manual are not documented in this paper.

Recommendations for implementing the final portfolio management model

The recommendations to implement and embed the final portfolio management model in the SOE were deduced from the literature (Mochal, 2014b; Daptiv, 2016; Gartner, 2017; BS ISO 21504:2015; PMI, 2012, 2013a, 2014b, & 2015a-c; OGC, 2008 & 2011; Skrabak, 2015; AtTask, 2015; Blomquist & Muller, 2006; Innotas, 2014; Jordan, 2015; and Nieto-Rodriguez, 2015), the experience of the researcher gained as the project manager that successfully implemented the SAP Plant Maintenance module in one of the divisions in the SOE, and inputs obtained during various workshops held with knowledgeable persons and the project team responsible for the implementation of portfolio management in the SOE. The following are recommended:

- Manage the implementation of portfolio management as a major transformation project under the executive sponsorship of the Project Director.
- Manage the implementation of the portfolio management best practices as a portfolio management solution/system re-implementation project.
- Appoint a senior general manager/general manager as portfolio management implementation sponsor and a steering committee to guide and oversee the portfolio management implementation project.
- Appoint an experienced organisational transformation specialist to successfully guide the organisation through the transformation.
- Appoint a capable senior project/programme manager and team with the relevant portfolio management implementation experience to manage the portfolio management implementation project.
- Consider the appointment of an implementation partner with a proven track record of successful portfolio management implementations if capable in-house resources are not available.
- Assess the adequacy of the current portfolio management Process Control Manuals (PCMs) and the interfaces to the PCMs of the other business functions and capabilities. Include the revision of the PCMs as part of the portfolio management implementation project scope.
- Assess if the functionality of the current SAP PPM solution/system is adequate. Give consideration to implement and integrate a leading portfolio management Software-as-a-Service (SaaS) solution with SAP PPM if it is found that the functionality of the SAP PPM solution is not fully adequate. Select a leading vendor with the capability and a proven track record of successful portfolio management solution implementations.
- Assess the state of the current data in the SAP PPM solution/system. Include data purification and conversion as part of the portfolio management implementation project scope.

Table 3 proposes the phases and summarised high level steps to implement and embed portfolio management best practices in the SOE.

Table 3: Phases and summarised high level steps to implement and embed portfolio management best practices in the SOE

<p>Mobilisation and planning phase:</p> <ul style="list-style-type: none"> • Document business need. • Identify alternatives. • Develop alternatives. • Select single solution.
<p>Design and development phase:</p> <ul style="list-style-type: none"> • Manage design and development. • Design solution. • Develop solution. • Close design and development phase.
<p>Roll-out phase:</p> <ul style="list-style-type: none"> • Manage roll-out. • Deploy solution (pilot site followed by phased implementation). • Set-up portfolios. • Close roll-out phase.
<p>Embedment and benefits realisation phase:</p> <ul style="list-style-type: none"> • Manage embedment and benefits realisation phase. • Make improvements. • Provide on-going user support. • Realise and sustain benefits. • Close embedment and benefits realisation phase.

CONCLUSION

This research study resulted in the following significant contributions:

- The literature review resulted in the publication of a detailed portfolio management research report/knowledge document that can be used by portfolio management practitioners as a portfolio management “handbook”.
- The researcher has expanded on the theory/body of knowledge on portfolio management by developing a tentative portfolio management model that can be used by academics and practitioners for education, training and application in practice. Organisations can use this model as an exemplar or roadmap to develop a suitable portfolio management model which they can use for implementing and embedding portfolio management best practices in their organisations.
- The portfolio management model (Figure 3) provided excellent context to the persons that participated in the interviews to understand the key elements of portfolio management. This figure clarifies the key inputs and the interactions between strategic management and business planning; portfolio management; project and programme management; operations; and it also shows how these functions contribute towards a sustainable business.
- The survey questionnaire developed by the researcher can be used by other organisations to establish the current state of portfolio management in their organisations.
- The researcher published the final portfolio management model and manual for the SOE to implement and embed portfolio management best practices in order to execute the strategies as outlined in the SOE’s Corporate Plan.

- The key recommendations and detailed implementation steps developed were published by the researcher in a report that serves as input for the project team responsible to implement and embed portfolio management best practices in the SOE. The key recommendations and detailed implementation steps can also be used by other organisations as a roadmap to implement and embed portfolio management best practices in their organisations.

A limitation of this study is that it is a single case only. It must however be noted that the final portfolio management model was reviewed for validity by various Groups/Divisions/Subsidiaries and functions in the SOE. As the final portfolio management model must still be implemented and embedded it should be further improved as lessons are learned.

The researcher sees the following streams of work stemming from this research study:

- The tentative portfolio management model developed from the literature can be used as the basis for further improvement of portfolio management theories, models and methods.
- The tentative portfolio management model developed from the literature can be applied and validated in other organisations.
- The final portfolio management model must be refined during the implementation and embedment of portfolio management best practices as lessons are learned.

The research study was concluded successfully. The research question has been fully answered and each of the main and sub-objectives was achieved. A final portfolio management model for the SOE was developed, reviewed and validated by persons from all the functions involved in portfolio management. The portfolio management roll-out approach and detailed implementation steps have been adopted by the project team appointed to implement and embed portfolio management best practices in the SOE.

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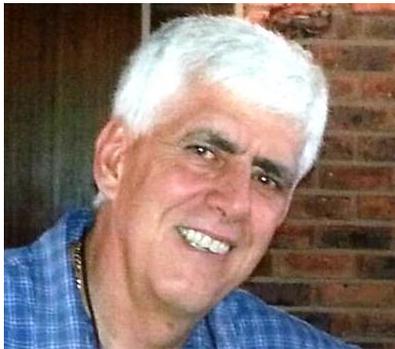
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Note: All references to documents of the SOE were removed for ethical reasons.

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