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The Role of the Project Management Office (PMO) in Product Lifecycle Management: A Case Study in the Defence Industry

Abstract

Research on Project Management Offices (PMOs) has concentrated on their structure and role as an integrator to facilitate, coordinate and support project activity across organizations and portfolios. This 'lateral' focus across organizations has to some extent disregarded the 'longitudinal' scope of the PMO and its potential to aid in the effective implementation of product lifecycle management. Here we examine critically the PMO's role as a longitudinal integrator of activity across the product lifecycle. More specifically we examine the PMO's potential to bridge the interface gaps that exist between product lifecycle phases. It uses the findings of an empirical study carried out in a multi-national defence company to research the interface between the bid submission stage and subsequent stages. It finds that interface gaps bring issues of inconsistent strategic intent across phases, dissimilar process and method used in separate phases, and poor knowledge management within the gaps between phases. It finds that the PMO can provide continuity across phases by maintaining coherence of purpose, process, and method, and integrity of knowledge to enhance the performance of both the pre- and post- gap phases of the lifecycle. It further suggests that exploration of the lifecycle-based role of the PMO may present opportunities to enhance the strategic value of the PMO within organizations and also improve the integration between project management practice and product lifecycle management. The study contributes to both the product lifecycle management literature and the literature on the role and function of the PMO.

Keywords

Product lifecycles; project-based organisations, interface gaps; project management offices.

Introduction

Contemporary analysis of project control within large multi-project organisations (Hobday, 2000) typically includes examination of the form and function of the Project Management Office (PMO)(Hill, 2014, Hobbs and Aubry, 2010). Initial work describing PMOs as rudimentary support units carrying out routine activities such as administration and archiving (Powell and Young, 2007), has been updated by more recent work which argues that PMOs are becoming increasingly sophisticated, expanding their activity from simply the completion of basic project support tasks to include the wider deployment of more complex control and coordination systems (Artto et al., 2011, Aubry et al., 2008, Aubry and Hobbs, 2011, Hobbs and Aubry, 2010). While the majority of research confirms an expanding role for the PMO and its responsibility for multiple functions (Hobbs and Aubry, 2010), closer scrutiny of the nature of this research has revealed a focus on the PMO as supporting business operations by coordinating assorted, 'un-linked' projects through the management of portfolio priorities (Unger et al., 2012).

With PMO research preoccupied with considerations in relation to both the design of the organisation and the composition of portfolios, little work has been done to investigate the role of the PMO in managing the complexities inherent in the product lifecycle (Stark, 2015) and specifically the dynamic interfaces between phases (Morris, 1988) that are characteristic of lifecycle management. Product development is complex and inherently challenging (Brown and Eisenhardt, 1995) and while the product lifecycle methodology has become the accepted method of addressing these challenges, recent work (Dekkers et al., 2013) has begun to suggest that there are issues, such as connectivity and knowledge management with this methodology.

With enquiry on PMOs dominated by attempts to understand 'lateral' considerations (those that exist across the organisation) such communication between functional areas, consistency of method and competence of personal there is a missed opportunity to investigate their role in managing longitudinal issues that are a feature of product lifecycles such as gaps between stages and coherence of practice and purpose through differing phases.

Recently some initial work (Artto et al., 2011) has been carried out which attempts to address the relationship between PMOs and lifecycles by characterising the role of PMOs at early lifecycle phases of innovation work. Here we endorse the importance of building on this earlier work and aim to extend it by analysing the role of the PMO within product lifecycle management and more specifically the points where normally sequential lifecycle phases become temporally dislocated leading to an interface gap at the transition between phases. One such example of an interface gap, which is a dominant feature of many lifecycle-based engineering industries such as defence and construction, is the gap between the submission of a solicited bid and the delivery work that commences on the eventual award of contract. The effective management of this gap in relation to team deployment and information integrity is crucial to ensure a smooth and prompt commencement of work post-contract award.

The objective of this article is to explore how the need to effectively manage through product lifecycle interface gaps may shape the role of the PMO within organisations that manage a large portfolio of lifecycle-based

products that are typically initiated by a long-duration, tendering process. The associated research question is therefore: what functions should the PMO undertake to ensure effective transition between the Bid phase and the subsequent Delivery phases of a product lifecycle?

This paper begins with a literature review to develop a clearer understanding of what has been written about PMOs, it identifies the antecedent conditions that led to their development and the key features and functions they exhibit. It goes on to explore the PMO's relationship with product lifecycles, then, drawing on empirical case study research within a defence company, it synthesises the research findings with the literature before drawing conclusions on the nature of the issues brought by the product lifecycle interface gap and how an expanded role for the PMO can resolve these.

1. Project Work and Structural Fit

Project management can be broadly understood as a new expert occupation (Reed, 1996) that is gaining increased prominence as one of a number of recently emerging corporate professions (Hodgson et al., 2015). Project management professionals assume responsibility for the delivery of projects on time, on budget and to a required level of performance in relation to both scope and quality, through the application of a proprietary body of knowledge comprising tools and techniques deployed to plan and control this 'non-routine' work (Hodgson, 2002). Project management in its current form emerged largely due to advances in the 1940s/50s in defence, aerospace and construction (Morris, 1997) and more specifically in the necessity to control increasing numbers of mega-projects (Hughes, 1998) within these and other industries. Although historically project management typically found application in many forms of engineering work, more recently due to advances in technology, the globalisation of supply chains and growing competition within markets, project management has increasingly been advocated as the most effective way to control any form of work that takes place in a complex and turbulent environment (Ekstedt et al., 1999). Indeed project management is now promoted across many sectors as a vital management capability useful in all uncertain and knowledge-intensive businesses (Whittington et al., 1999).

While the utility of project management is now gaining widespread acceptance, from its earliest deployments those experimenting with the practice of project management found it to be an uneasy fit with the predominantly functionally structured organisations of the time. These structures used strict division of labour and process and were primarily concerned with facilitating scientifically managed (Taylor, 1911) mass production work where reliability, repeatability and consistency were critical. Very quickly it was found that forms of management deployed to control unique and uncertain work required other considerations.

Shepard (1956), in his early exploration of the management of professionals, neatly introduces the dilemmas of projects in relation to the non-routine work of research scientists. Here Shepherd explores the difficulties of tackling complex problems within a strictly functional organisation and in doing so effectively anticipates many of the current problems found in managing contemporary Research and Development projects outlining issues such as lack of cooperation across functional boundaries and the limitations imposed by 'too-narrow' specialisation.

Following Shepherd, the 1960s witnessed a growth in work researching the management of projects within the organisation and from this research two distinct but related strands of enquiry emerged. The first strand was concerned with the structure of organisations, in effect an extension to work already ongoing in relation to organisational design (Morris, 2013), and built on the proposition that different forms of organisational structure produce different contexts, some of which are better suited to projects than others. In this strand the aim of the research was to define a structure within which the project would most easily fit. Contributions here very quickly focused on the matrix structure, and the use of the resource-provider/resource-user relationship as the best facilitator of project work (Mee, 1964, Galbraith, 1971).

The second strand was concerned with the work of the project manager and his/her role as a 'unifying agent' (Cleland, 1964). In contrast to the structuring debates this work aimed at defining the role of the project manager as coordinator and integrator in part to make up for deficiencies in the structure of the organisation. Both of these strands have continued to evolve into a substantial body of knowledge currently bound up in the literature on Project Based Organisations (Hobday, 2000) and temporary organisations (Burke and Morley, 2016, Lundin and Söderholm, 1995).

2. Structures, Portfolios and PMOs

While these strands of research effectively address many of the structural and process issues of project 'fit' within the organisation, more recently a further dimension has emerged within firms that manage large and complex projects, programs and portfolios. Increasing scale and complexity of project activity (Miller and Hobbs, 2005), both within firms and more crucially within society in general as it projectifies (Lundin et al., 2015), served to highlight issues of support to the project manager and fit of the project management system within organisational structures. These issues were especially acute within firms where projects had become the dominant form of organising.

An early feature of writing on project management and organisations was the emergence in the 1970s of the Project Support Office (PSO) (Powell and Young, 2007) which in its initial, somewhat rudimentary, form supported the systematic implementation of project management within the organisation. The 1990s saw the rapid increase in the implementation of what by then had become known as the Project Management Office (PMO) (Dai and Wells, 2004) while a study by Thomas and Mullaly (2008) found that by the mid-2000s the PMO had become central to the use of project management in many firms. Current thinking defines a PMO as:

> …an organisational structure that standardises the project–related governance processes and facilitates the sharing of resources, methodologies, tools and techniques (PMI, 2017)

Although still congruent with this relatively brief definition, the PMO can now be found in many forms which have evolved to occupy a range of organisational niches as companies (DeFillippi and Lehrer, 2011, Whitley, 2006, Burke and Morley, 2016) and groups of companies (Defillippi, 2016) across diverse settings seek to deploy project management in a variety of ways within their organisations and supply chains in an effort to add value to their business.

Attempts to make conceptual sense of this growing complexity has inevitably led to efforts to categorise PMOs. As a consequence a number of typologies have been suggested generally based on certain broad characteristics such as a PMO's location in the hierarchy (Crawford, 2002), its organisational purpose (Kendall and Rollins, 2003) or its scope of activity (Dinsmore, 1999, Englund et al., 2003). However prior to the comprehensive research study conducted by Hobbs and Aubry (2007, 2008, 2010) no typology had been thoroughly empirically verified. Moreover the findings of this study led Hobbs and Aubry to conclude that each typology represented an over-simplification of organisational reality. They argued that contemporary PMOs are complex entities performing a variety of functions and which exist in a plurality of forms constantly changing to fit the various contexts in which they reside (Hobbs and Aubry, 2010).

Their research suggests that PMOs are somewhat amorphous entities and attempts to elucidate rules of their organisation and therefore to create lenses through which to view them have so far been insufficient (2010:71). In relation to typologies Hobbs and Aubry (2010:101) find evidence only for a typology based on two variables: 1) number of projects and 2) number of project managers within a PMO's control. Of more relevance to this research is their proposed conceptual model composed of organisational context and PMO structure and function (2010:52) that can be used to characterise PMOs. The specific interest here is in contributing to understanding of how PMOs function.

3. PMOs and Lifecycle Models

While this research by Hobbs and Aubry identifying PMO functions is comprehensive, like much previous writing it remains preoccupied with lateral considerations related to organisations, such as competence and methodology, and across project portfolios, including monitoring of progress and client management (2010:52). The concern of this research is to contribute specifically to the understanding of PMO longitudinal functionality in product lifecycles where non-contiguous activity, and therefore the existence of interface gaps (Morris, 1988), is a feature.

These longitudinal considerations are increasingly of relevance and recent research on the PMO has focused on the expansion of the PMO role in two ways firstly, to become involved in the evaluation of bids and secondly, to be more active in setting the strategic direction of the organisation (Srivannaboon and Milosevic, 2006).

Product lifecycle models have been developed as tools to add longitudinal control to operational activity as it progresses. Here temporal integration of activity is typically expected to take place as a result of plans that manage sequential interdependence. To help with this, activity is normally broken down into phases punctuated by dynamic transitions (Morris, 1988) and at these transitional points between phases often an interface gap exists. The simplest product lifecycle models may include only two stages such as development and production, or installation and support (Artto et al., 2015). Other models are more sophisticated such as the six stage CADMID model (DSE, 2002) for controlling phases of engineering work. In the broadest sense product lifecycle models have been developed that capture all phases of product management (Stark, 2015, PMI, 2013), and in simple terms are used to add structure and order to complex activity. The discipline of ensuring each phase is

completed prior to the start of the next ensures minimum risk and maximum value is passed along as a product moves from phase to phase.

Lifecycle models appeared early in management writing. Gaddis (1959) talks about the role of the project manager in technical work and how s/he must take the product through all phases of the lifecycle and Mee (1964), suggests a simple lifecycle model is required with phases including analysis, development and production. From this early writing little appeared in the operations management literature until more recently where considerations such as the need to manage innovation (Milewski et al., 2015), growing sophistication in product design (Papinniemi et al., 2014) and product control (He et al., 2006), more complex supply chains (Chiang and Trappey, 2007), the lifecycle-based trend towards servitization in manufacturing and engineering firms (Datta and Rajkumar, 2011, Vandermerwe and Rada, 1988, Baines et al., 2009, Martinez et al., 2017, Batista et al., 2017) and the growing sustainability agenda (Gmelin and Seuring, 2014, Bevilacqua et al., 2007, Mascle and Zhao, 2008) has reaffirmed the utility of product lifecycles models and increased overall interest in them.

While both the PMO and product lifecycles have been extensively researched there is little research linking the two. This is surprising as it seems clear that both are complementary, each existing to add rigor to the control of operational activity as it progresses over a period of time. However as each exist in a different domain with the PMO generally associated with project management and the product lifecycle model with operations management mechanisms for linking the two may be less obvious.

Broadly there are two aspects to investigate in relation PMO function and product lifecycles. First is the nature of PMO work during in-phase activity and second, the nature of PMO work within the interface gaps between phases. Very recently some work (Artto et al., 2011) has been carried out in relation to in-phase activity, specifically the contribution of the PMO to early innovation phases, but PMO support within interface gaps between phases remains largely neglected.

4. Interface ‘Gaps’ and Lifecycles

Interface ‘gaps’ that exist at the transition between lifecycle phases can be roughly categorized into two forms. First, those that exist between phases that are fully contiguous where each phase follows the previous with a very short gap between, the length of which is typically determined by a finite and well-understood task such as a review activity carried out to ensure readiness for next stage. Second those that, due to the nature of the work, are ‘forced’ to be temporally dislocated requiring a large ‘gap in time’ between the completion of one phase and the beginning of the next. The key point here is that short duration gaps tend to be accommodated in the project plan and require little or no special consideration outside normal project control activity. However longer gaps interrupt the smooth flow of the lifecycle and in some cases may result in project dispersal including team redeployment to other work and therefore complete suspension of all activity. One such gap is the delay between submission of tender and award of contract (and associated commencement of activity on the next lifecycle phase) which is a feature of many types of business that are structured around a competitive bidding process. Early work by Mee (1963) rather obliquely references this gap, stating it as a concern in the tendering

process where successful outcome may be contingent on the contractor's proven ability to setup a temporary organisation to facilitate contract delivery.

5. Interface 'Gaps' in the Defence industry

Defence is one of many industries that use a lifecycle approach to structure and control business activity. In this industry projects are the dominant form of organising work and therefore companies operating in this sector can be categorised typically as Project Based Organisations (PBOs) (Lundin and Söderholm, 1995). Within PBOs the majority of revenue generating work is carried out within either customer or internally funded projects so organisational structures are more heavily weighted to the project rather than the function.

Firms in this sector typically manage a portfolio of products, at various stages in the product lifecycle. Work in the defence industry is typically organised around the Concept, Assessment, Demonstration, Manufacture, In-service, Disposal, (CADMID) (DSE,2002:13) Product Lifecycle Model. Here interface gaps are a feature as the work transitions between phases in the product lifecycle especially as each phase maybe further segmented into several sub-phases where the activity is customised to suit a particular piece of work.

Gaps are also exacerbated due to the dominance of public-sector procurement strategies which favour rolling programs of work where funding is typically released in stages (rather than a single tranche), the initiation of which is often contingent on the outcome of work in a preceding stage. This product lifecycle model and procurement strategy combined with sophisticated products/technologies and (often) large interconnected supply chains results in a complex situation where the potential for interface gaps of significant duration is high.

Gaps can occur for a number of reasons. Gaps maybe pre-planned due to the timing of funding release between phases of ongoing programs. They may also be emergent for example due to unplanned schedule slippage by another supply chain stakeholder or slow decision-making by the prime contractor.

However more critically, and the concern of this research, gaps can also exist due to the business tendering process, as the time between bid submission and eventual contract award. The phases at either end of the gap may vary, for example Assessment leading to Demonstration, or Demonstration leading to Manufacture or any of the sub-phases within a particular package of work. This is because often each phase is subject to separate pricing and contract award with funding for the entire lifecycle rarely awarded at one time. This is especially true for vendors at lower levels of the supply chain. Here each phase has the potential to be preceded by a Bid phase. Therefore this particular form of interface gap is particularly important to the work of the PMO and the success of the overall business.

Work investigating the nature of such lifecycle gaps is sparse and work exploring the scope of responsibility of the PMO from a longitudinal perspective has been similarly neglected. This work will address this by researching the lifecycle interface gap that exists between a lifecycle bid phase and the subsequent lifecycle phases.

This research will specifically investigate how the need to effectively manage through these interface gaps may influence how PMOs are set-up and structured particularly within organisations that manage a large portfolio of products that are typically initiated by a long duration, competitive tendering process. In doing so this work will

scrutinize the ambiguous role of PMOs with respect to product lifecycles and define how a well-structured PMO can contribute 'longitudinally' to integrate, coordinate and support activity within a lifecycle-based organisation.

6. Methodology

This research is qualitative in nature, using semi-structured interviews with a broad sample of managers working in the UK defence industry within Thales UK. Data was collected from 17 research participants, all held project responsibilities of varying seniority and levels of experience and were selected based on their role as key Project Management and PMO stakeholders. Due to geographical constraints 12 interviews were conducted face-to-face and 5 by telephone. Participants were selected from three broad categories of employee to illicit a range of views. These categories were; Executive Management comprising the Bid and Project Management Director for Thales UK; the Head of the PMO for Thales UK, 2 operations directors and 2 business directors; Project Management comprising 5 active project managers working on live bids and projects; and PMO professionals comprising 2 PMO Managers and 4 PMO specialists. The age profile of participants ranged from mid-20s to mid-50s with an average age of 40 years and the research was carried out between May and August of 2015.

Semi-structured interviews were employed to deliver flexible and comprehensive narratives through the joint construction of meaning following the model of the 'active interview' (Holstein and Gubrium, 1996) the objective being to stimulate active narrative construction by prompting interviewees to articulate and reflect upon their position. The content of these interviews was informed by a review of literature on project management, PMO and organisational design.

Interviews followed a standard protocol generated by researchers, lasted between 30 minutes and 2 hours and were digitally recorded, then transcribed, anonymised and collated. The outcome of each interview was therefore an in-depth account representing an articulation of the views of informed subjects in this field.

Data analysis was done using NVIVO and was carried out in three stages. First, using an iterative process, selective coding of data was carried out (Strauss and Corbin, 1998) with two coders independently analysing the transcripts using an open coding strategy. Each researcher captured the results of these analyses on a table which included all relevant interviewee comments, the researcher's interpretation of these comments and the researcher's proposed code for each comment. Second, these tables were jointly analysed to finalise a common group of codes. Third, the agreed codes were then jointly analysed for commonality and it was found that all codes could be grouped into 3 broad categories; 1) linking of bid work to subsequent lifecycle phases, 2) the overall role of the PMO and 3) the structure of the PMO. Finally, the three categories were built into an emergent narrative (Strauss and Corbin, 1998) forming the structure for the analysis section below.

In addition, review of the existing PMO structure and function was conducted in order to allow the researchers to contextualise the data. This was done through systematic analysis of Thales UK, product management process and practice documents.

7. Background

Thales UK is a subsidiary of the Thales Group, a French-based multi-national organisation that provides technology products, solutions and services to the Aerospace, Transport, and Security and Defence markets. The organisation has a global footprint with 61,000 employees operating in 56 countries delivering sales of €12,974 million and profit of €985 million (Earnings Before Interest and Tax) in 2014 (Thales, 2014).

Thales is organised into six Global Business Units: Avionics; Space; Secure Communications and Information Systems; Defence Mission Systems; Ground Transportation Systems; and Land and Air Systems. The research study was primarily performed within the Land and Air Systems (LAS) business unit which specialises in the design and manufacture of complex technology solutions, products and services for civil and military applications for the UK domestic and export aerospace and defence markets (Thales, 2015). LAS has approximately 1,500 employees across 9 sites in the UK, and can be described as a matrix organisation (APM, 2015).

Thales, manages a portfolio of projects and therefore uses a particular contemporary form of the PMO, the Project Portfolio Management Office (PPMO)(Unger et al., 2012). This form is used within organisations that hold diverse portfolios of discrete projects (Morris and Pinto, 2007) and product families and here projects effectively 'compete' for a limited set of in-company resources (Archer and Ghasemzadeh, 1999). In general within firms that rely on successful project delivery as their main source of income the management of portfolio priorities is elevated to a strategic level. This has two parts; first, the strategic selection and pursuit of the correct 'prospects' to be won; and second, the strategic management of priorities among 'already won' live contracts (Morris and Pinto, 2007). So with the emergence of this added dimension the long-standing issues of lateral coordination of activity between multiple contracts within a portfolio is joined by the longitudinal issues that come with controlling activity along the product lifecycle.

The project management organisation is responsible for managing the delivery of a contract within cost, scope and schedule parameters and coordinating the activity across the various business functions such as Engineering, Manufacturing, Supply Chain, Quality Assurance, Commercial and Finance. The product lifecycle is typically initiated when the organisation responds to an invitation to tender from a potential customer which triggers the bid phase. The objective is then to generate a winning and profitable proposal with a viable solution for the customer. A project manager is assigned to lead the bid and to form a temporary organisation (bid team) with the role of obtaining commitments from the internal stakeholders (functions) and external suppliers in relation to scope of work, estimates, technical requirements, costs, performance and schedule. The proposal is validated through an internal gate process before being formally approved and released to the customer as a tender. The bid duration can range from weeks to several years.

It is common for a significant time gap, often weeks or months, to exist between tender submission and the receipt of the win/loss decision from the customer. During this gap work typically enters a period of suspension until a decision has been received. The temporary organisation that was formed to deliver the bid, including the project manager and project team are generally reassigned to other work in the organisation.

If the tender is successful a project manager is assigned and a new project team is formed. The team is responsible for executing the work for the client. The team will first hold a launch review to validate the information carried from the bid phase. There are often issues arising from this review such as changes of resources, re-estimating, assumptions not being realised, scope modifications during contract negotiations resulting in changes to the baseline. These issues occur typically as a result of the interface gap between bid and contract award and the lack of ownership of the prospect during this period. Here as is common the Bid stage of the product lifecycle is owned by the business winning function while the delivery phase is owned by the delivery team.

On receipt of contract the delivery team are supported by the PMO organisation which facilitates the successful completion of activity by providing risk and schedule specialists, tools, standards and best practice process. The PMO organisation currently in place within Thales UK can be compared most closely with Stage 3 – 'Standard PMO' of Hill's (2004) competency continuum as it exists at senior management rather than board level with a scope of responsibility for the business unit rather than the entire enterprise. In addition the PMO is responsible for most of projects and project managers within the business unit and can be classed therefore as Type 4 in the Hobbs and Aubry, (2010) model. A typical product lifecycle phase can be between one and five years in duration.

While characteristic of the defence industry, this approach where revenue is generated through delivery of a portfolio of customer contracts which requires longitudinal control of long-term, lifecycle-based work is present in other complex engineering industries. Construction and Oil and Gas are typical of this where, again, bid work or early-stage feasibility or other risk reduction work may be carried out in a non-contiguous fashion requiring the consideration of gaps between phases in the product lifecycle.

8. Findings

All interviewees expressed the view that there were advantages in reducing the lifecycle gap that exists between the business winning phase and subsequent delivery phases. Most commonly this rationale was based on the efficacy of the Product Lifecycle Management Model and more specifically the aspiration of a single 'unbroken' stream of activity.

8.1 Linking the Bid to subsequent Lifecycle phases

All interviewees spoke of the importance of a 'joined up' approach and this comment typified these comments:

> *It is very important to have a continuous process from the bid phase to the project phase as this is essential in establishing accountability through the lifecycle from bid to implementation to service and support, it is also important because decisions made at the bid phase can have a significant positive or adverse impact during the project phase.*
>
> *(Executive 4)*

While acknowledging that professional Bodies of Knowledge, academic literature and industry practice tend to affirm the need for two distinct phases of activity, this, more cerebral, interviewee questioned the underlying logic that had created this interface gap:

> *In the first instance the question is flawed because by seeking to define a bid phase and a project phase we are failing to recognise that you cannot complete a bid without understanding the project, and therefore by definition they are a continuous process, one preceding contract award, and the other following it.*
>
> *(PM 5)*

The same interviewee then went on to question if the content of a bid (if won) can be effectively delivered at all when this interface gap is present:

> *I would argue that without analysing and thoroughly understanding how the project is going to be delivered its impossible to optimally tailor the bid.*

This view was common among interviewees with most expressing the opinion that bids were an integral part of the project. This interviewee stated:

> *In my opinion the treatment of a bid as a project from the very start is crucially important if you want the bid to be a success and the project to be a success, in other words we want to run the bid as a project.*
>
> *(Executive 1)*

Others elaborated, restating the criticality of continuity to the integrity of the bid but also indicating there are associated risks if the lifecycle gap is present. This interviewee strongly asserted that:

> *Any discontinuity between the bid and project introduces a significant risk to the project performance. (Executive 6)*

This view was reinforced by others who highlighted the main risk associated with this interface gap by admitting to:

> *'reinventing the scope and project structure post-contract only to find there are omissions, resulting in late delivery and overspend' (PM 4) and often 'spending a month reinventing what was approved'.*

This interviewee summarised stressing that:

> *…the bigger the gap between bid and project, the more scope for uncontrolled change and more chance of rework during project start-up.*
>
> *(PMO 4)*

Personal accountability was also discussed as a possible risk with many views expressed on the ownership of both pre-contract and post-contact activity. This interviewee emphasised that the same project manager should be used throughout the lifecycle because, in relation to the pre-contract bid phase, this would:

…encourage those negotiating the contract to feel the consequences and therefore learn the mistakes (if any) that were made during the bid phase, and feel the pain of the costs if things go wrong, therefore encouraging continuous improvement within the overall lifecycle.

(PMO 3)

Further, in relation to the post-bid phase, it would:

…ensure ownership and accountability… …and the desire to meet the true cost estimates that were defined in the bid phase as well as providing a consistent customer interface throughout the lifecycle.

(Executive 3)

Another added that, although difficult from a resourcing perspective, it is:

…also beneficial to have continuity of a core team (key personnel) within the project.

(Executive 5)

The benefits of continuity of personnel were mentioned often with this interviewee claiming that:

…ideally we would have the same team on the job throughout the lifecycle, and the knowledge would be retained, removing the risk of gaps and time for new team learning curve.

(PMO 5)

While it is clear that some form of continuity must be achieved between the activity carried out in preparing and submitting the bid and the activity involved in executing the work once the bid had been won there was some debate about the commonality of the type of work carried out in each stage. A more senior manager, taking a more strategic view, stresses the differences between the work within the bid phase and subsequent phases suggesting:

…the objectives are different, in that the bid phase is about business winning ultimately, and the project phase about project delivery.

(Executive 2)

This view on the differing nature of work is also evident in the perception of the skill-set required in managing delivery projects as opposed to managing bids. This interviewee concurs that it is useful to have continuity of personal but suggests that utilising the same person to manage both the bid phase and subsequent delivery phases may be less desirable stating that:

…it is beneficial to have continuity of a core team (key personnel) within the project. However, it is not essential that the Bid Manager needs to become the Project Manger as often these roles have different skillsets.

(Executive 5)

However, this view is contradicted by another interviewee who counters by arguing:

…the same skillsets are involved between the bid and project phase to meet deadlines – managing multi-purpose teams, cost, schedule, delivery, etc.

(PM 3)

While this disagreement was a feature of much of the commentary, one interviewee suggested a compromise position revealing that:

...in the ideal scenario, the bid manager would become the project manager.

(PM 2)

He then goes on to admit that due to wider business issues such prioritisation and manpower shortages the ideal is often not possible and recommends that:

If we can't achieve this ideal scenario, then bid managers should have experience of running projects, and project managers should have experience of running bids, thereby complimenting their knowledge base and delivering successful bids and projects.

(PM 1)

8.2 The Role of the PMO

With general agreement that a continuous lifecycle is desirable, interviewees were then asked to comment on the efficacy of expanding the role of the PMO to include bid work as a mechanism for bridging this gap. This interviewee acknowledges the aforementioned differences in purpose between bid phase and delivery phase but suggests that the issues caused by this could in fact be eliminated by pulling the phases together:

There is a real danger that in the preparation of a bid, many of the aspects that are intrinsic to the delivery of the associated project are missed, overlooked or simply compromised to achieve a 'winning solution', similarly, there are a huge number of project delivery opportunities which can be exploited as part of the bid activities if the appropriate people are engaged.

(PM 5)

The same individual then goes on to suggest that:

By combining the Bid infrastructure with the PMO, the opportunity exists to have a single entity which is engaged from inception to delivery and thereby maximize the opportunity, the knowledge and the effectiveness.

(PM 5)

Complementarity between bid phase and subsequent delivery phases is a theme that is developed by others. For example this interviewee states:

…the bid and project parts of the lifecycle complement each other. If you can get the PM understanding the project aspects, they can positively affect it during the bid phase.

(PM 1)

Others talked not only of the complementarity in activity within each section of the lifecycle but of the complementarity of support provided by the PMO. Here this interviewee comments on the composition of the PMO by noting:

…the key components from the PMO function are consistent in both of the phases so they should absolutely be continuous and consistent, e.g. WBS, Schedule, etc.

(Executive 2)

This same interviewee then suggests that the task of the delivery phase is to:

…expand on the level of detail' provided from the bid phase but not to fundamentally change the structure of the project that has been carried over.

(Executive 2)

Another interviewee further expands on the commonalities by noting that:

…most of the services that a PMO should provide apply equally to the bid as to the project i.e. risk, planning, estimating, etc.

(PMO 4)

Before adding that an additional benefit is the possibility of a project management system that spans both phases and:

…by providing these from a common organisation (PMO) there is more opportunity to end up with a consistent project model.

(PMO 4)

Following this theme a number of benefits that might result from combining responsibilities within a PMO were suggested. These tended to fall into two categories; first, consistency in implementation of project management methods and second; improvements in performance. This interviewee suggests that benefits may include:

…the consistent implementation of best practice to optimise the functional performance into (sic) improved bids and project success.

(Executive 2)

And another who suggests:

…common structure, tools, resource management, forecasting, processes, leading to improvement in projects and business performance.

(Executive 3)

This views are neatly encapsulated in these comments who proposes that joint responsibility within a PMO would result in:

…an enabler that allows a continuous flow of data to achieve the clean flow from the bid phase to the project phase.

(PMO 3)

With the PMO having:

…a key role in ensuring alignment between what was submitted in the bid and what is actually delivered during the project.

(Executive 4)

A useful summary is provided here where this interviewee proposes that the benefits of joint responsibility within a PMO:

…are probably too numerous to list but would include independent monitoring of projects and performance, resource monitoring and management, professional discipline support, data gathering, data analysis, information & metrics management and provision.

(Executive 6)

However creating a PMO with responsibilities for Bid work does requires some changes in the way a more traditional PMO operates especially in relation to bids. This interviewee proposes that:

The PMO needs to be flexible in its approach to ensure its levels of support provided to the teams are aligned to the needs of the bid.

(Executive 1)

8.3 Structuring the PMO

With an expanded role to incorporate control of activity associated with business winning the structure of the resulting PMO came into question. This interviewee recognised this expansion in role by suggesting a more complex configuration suggesting it should be:

…structured using a 3 tier approach: with a strategic governing level at the top; supported by a local functional layer; and a delivery PMO layer such as a project controls office.

(Executive 2)

In addition to hierarchical considerations others reflected on lateral considerations stating the PMO:

…should also be structured to ensure appropriate support to the relevant phase in the lifecycle, and provide a flexible workforce that is mobile across projects.

(Executive 3)

Another interviewee expanding on lateral considerations went further recommending that:

…a matrix approach may optimise efficiency as the BPMO can provide specialists across the range of projects within the overall project portfolio.

(PMO 3)

This suggestion of an organisational unit termed a BPMO as a standalone function represented a theme that was developed by this interviewee who proposed:

In general terms I believe that a BPMO should have an equivalent standing to any other function or discipline.

(Executive 6)

The term BPMO was used by a number of the interviewees. Although not formalised within the organisation it became evident during the course of the interviews that the phrase had recently entered the vernacular.

As well as internal PMO structuring considerations this interviewee then went on to talk about external considerations and how, using his term, a BPMO might fit within the larger context of the business:

The structure would be different dependent upon the business that it was intended to serve, thus a business with a small number of large complex projects would require a different structure to that of a business which a large number of smaller projects to serve.

(PMO 1)

This external view was expanded upon by another interviewee who talked of how a PMO might support an organisation with multiple businesses, suggesting the implementation of PMOs:

…aligned to Business's, which contain standard roles relating to PM, BM, Capability and Resource, and a Planning and Controls focus, plus specialist roles such as risk specialists and resource management specialist.

(Executive 5)

9. Discussion

It is clear that interface gaps are an unavoidable feature of the defence industry as it is characterised by a particular type of procurement model that is commonly combined with the CADMID-based product lifecycle. These gaps are especially acute in the contract tendering process at the interface between a bid phase and a delivery phase. It is also clear that this gap brings a number of issues which affect both the successful completion of the bid and the subsequent effective completion of the work. To make sense of this and investigate the role that the PMO might play in helping the organisation to manage through these gaps it is perhaps useful to look at the data from both a strategic perspective and an operational perspective.

From the strategic perspective the key issue is the difference in purpose between the bid phase and delivery phases of the lifecycle. Strategically the purpose of the bid phase is to efficiently win contracts so, consequently, bid performance is typically measured in relation to two simple metrics: bid win-rate and bid cost. This performance data is available with a high degree of immediacy and clarity. While strategically the purpose of contract delivery phase is to complete the required scope of work on time and to cost resulting in a profit for

the business, a satisfied client and hopefully follow-on business. The performance data in the delivery phase tends to be gathered over the longer term, is often reported incrementally and often lacks clarity due to both the complexity of ongoing work and the relative limitations of project performance measurement systems.

To win a contract, the submitted bid must (at least) be compliant with the stated customer requirements in relation to cost, schedule and scope. This overarching purpose of winning the contract must be balanced with two further considerations. Initially, in the short-term, to ensure the cost of the bid itself is low so the ratio of 'bids won' to 'cost of bids' is favourable and then in the long-term, to ensure the subsequent contract can be executed in-line with the aforementioned customer requirements.

These considerations bring two related tensions. The first tension is between the short-term objective to win the contract and so achieve the win-rate targets and the long-term objective to ensure an executable delivery phase and ultimately achieve overall customer satisfaction. The point of note is that time is required during the bid to make an assessment of the organisation's ability to execute the subsequent contract and strategic resolve is required to 'weed-out' risky yet otherwise attractive tenders. Pressure to submit a compliant bid which is not supported by the required organisational capability may ultimately result in the award of a contract that is difficult or indeed impossible to deliver successfully.

Assuming that the contract is within the organisation's capability the second tension must be considered and it is that between the quality of the bid and the cost of creating it. Here the time spent within the bid phase on planning the content of the bid, while ultimately ensuring both bid integrity and a set of useful information that can be carried over to the delivery phase, also adds to the cost of the bid. Therefore an imperative exists in the bid phase to keep bid costs to a minimum and this imperative may lead to foreshortened and insufficient planning activity and therefore a poor bid which fails to win a contract, or a bid which wins the contract but includes information that is of little use within the delivery phase. Should the contract be won this results in additional time spent, during the delivery phase, reworking the planning and so incurring additional time and cost penalties.

The findings suggest that combining the responsibility for bid and delivery within the PMO would provide a twofold solution. First, as the imperatives of successful business winning and effective contract delivery would be combined within the same organisational entity (the PMO) a more strategic dimension would be added both to the lifecycle process and to the PMO. This is consistent with Hobbs and Aubry's (2010) identification of strategic management as a PMO function while providing the PMO with an enhanced role. Second a more streamlined lifecycle management process would result. This is also consistent with both Hobbs and Aubry's identification of the PMO's 'monitor/control' function because continuous control of the lifecycle would be maintained during gaps, and with the PMO's 'competence/method' function as the same tools and process would then be used in both the bid phase and in the delivery phase.

These solutions have two further benefits. First, from an organisational perspective, deploying the PMO in this way would better embed coherent processes. And second, from a lifecycle management perspective it would more clearly lead to a set of planning which could be more effectively carried through phases rather than, as is

common, a set of bid information which is discarded after the bid phase then reinvented in the delivery phase by the delivery team. Additionally the ownership by the PMO of both the bid phase and delivery phase would encourage better work to be done on bids which balances more effectively the short-term need to win 'at all costs' against the long-term need to set-up an executable delivery phase should the contract be won.

Now moving from the strategic perspective to the operational perspective, the findings suggest that continuity between the bid phase and the delivery phase is important and this is best achieved through continuity of deployed human resource. However the existence of the interface gap between the end of the bid phase and the start of the delivery phase makes resource planning problematic. This issue exists due to the often uncertain nature of business winning activity, and more particularly in the unpredictability of the time taken for the client organisation to assess the bids, decide on a winner and award the contract. The length of the interface gap is therefore often unknown, so planning the deployment of staff is difficult for two reasons. First during the interface gap it is impractical and expensive to maintain a 'standing army' of staff who worked on the bid and who are waiting to be deployed on the delivery phase; second it is difficult to find suitable work on which resource can be deployed; and third it is equally difficult to reconfigure already deployed resources at short notice.

However these research findings indicate that while it is preferable to have the same personnel working on both the bid phase and the delivery phase, it is more important to ensure the integrity of the bid data. So if the same team cannot be transferred between phases the PMO could act as both the owner of the process of generating this data, ensuring it was generated in a way that is coherent across bid and delivery phases, and custodians of this data to ensure it is passed in a timely and effective way across phases.

Further, as was suggested by one interviewee, ensuring the same personnel work on both phases is less important than ensuring that personnel working on each phase have experience of the other phase and therefore work in a way that is complementary to it. This indicates that commonality of process and system may make the need to retain the same personnel unnecessary as all personnel could be made familiar.

Referring to the Hobbs and Aubry (2010) functional categories there are three points of interest. First, control of project personal personnel is clearly a PMO responsibility and for a PMO to do this effectively it must have visibility of all personal and the ability to deploy them at all stages of the lifecycle. And with greater control of the lifecycle the PMO would be better to manage staff across the portfolio leading to fewer instances of un-deployed or over-deployed staff. Second, and relatedly, the competencies of staff could be better managed in relation to both bid and delivery skills. And finally the knowledge management function of the PMO could be utilised to control bid data.

Assuming that the existence of this interface gap is a problematic but immutable characteristic of this product lifecycle and this gap cannot be bridged using common resources, the most effective solution therefore seems to include; firstly, commonality of purpose, of process and of practice; secondly, the familiarity of personnel with both bid and delivery lifecycle phases; and thirdly, better information integrity and ownership. All of which currently are understood to be the responsibility to the PMO as part of its role within the business.

With general agreement that continuity during the product lifecycle is preferable but not always possible, and that some form of continuity needs to be achieved using process, personal and data managed by a PMO this research suggests that the expanded role of the PMO to include bid work does fit within contemporary thinking on the function of the PMO but does requires some fundamental rethinking beyond simply the 'bolting-on' of responsibility for bid activity.

In relation to this a number of suggestions were put forward by interviewees. Most significantly it was suggested that the PMO must contain a strategic dimension which ties into both the management of the portfolio of products and the overall strategic direction of the business. Relatedly others suggested that this expanded PMO must be considered as a function and be given the emphasis and positon within the structure that befits this status. In summary this implies that interviewees were keen to see the discipline that a PMO brings being applied more rigorously across the product lifecycle.

10.Conclusion

By using an empirical case study in the defence industry, this article has investigated the functionality of the PMO (Hobbs and Aubry, 2010) and is relationship with the product lifecycle (Stark, 2015) and in particular how it might help to solve the issues inherent in lifecycle interface gaps (Morris, 1988). In doing this it contributes in three ways.

First, to the operational literature on lifecycles where it specifically identifies three significant issues that exist due to interface gaps. These are differing strategic intent within differing phases, inconsistent process and method between phases and lack of knowledge management and poor resource control within interface gaps.

Second, to the project management literature where it expands on understanding of the role of the PMO and how it can use its functionality to solve the issues interface gaps bring. It suggests that attempting to deploy the same resource across phases and/or hold a standing army, the traditional solutions used by companies, is troublesome and often impractical. Instead this analysis demonstrates the importance of applying the same approach and methodology throughout, and effectively managing information across the gap (Dekkers et al., 2013) to ensure the subsequent stage launches from the proper baseline that has been set in the preceding stage.

Third, from the perspective of operations strategy (Maylor et al., 2015), this research suggests ownership of both phases by the same entity (the PMO) brings a coherence of purpose to the lifecycle resulting in less chance of the longer-term objectives of the delivery phase being marginalised to suit the shorter-term objectives of the bid phase. While PMO control of personnel in both phases is beneficial and allows more consistent resource deployment across phases, PMO control of process and knowledge to some extent negates the need to do this which results in simpler resource allocation across the organisation's portfolio..

Although the transition from bid phase to delivery phase provides only one form of interface gap it is clear that this research is applicable to gaps that exist at any stage in the product lifecycle as strategic intent,

methodological approach and information integrity are key to the effective delivery of long-term lifecycle-based activity.

Limitations and Future Research

While this research has focused on PMO activity and is limited to one form of interface gap, it represents one aspect of the little-explored phenomena that exist at the interstices of operations and projects within all lifecycle-based industries. Therefore it has a number of ramifications which suggest future significant avenues of research.

First it resonates with current debates on how the role and function of the PMO can continue to evolve as a value-adding entity (Hobbs and Aubry, 2007). Even though it has come to be accepted that a strategic role for the PMO is often desirable, especially if the PMO is to be afforded the same status as other more established functions, until now it has been less clear what the PMO may contribute in this strategic arena. This study suggests that PMO involvement early in the product lifecycle in activity such as business winning is one possible way for project management to become more strategically active (Hobbs and Aubry 2010: 105). More direct involvement in the winning of business leads easily to a greater participation in shaping the composition of the portfolio with attendant benefits in the subsequent management of the portfolio. Additional research is therefore required on how the PMO can become more active in business winning activity.

Second, while it is clear that the extension of the role of the PMO (Aubry et al., 2008) along the lifecycle can create a form of continuity this additional responsibility suggests further potential for an expanded role for the PMO. With the long-term sustainability of the PMO as a mainly transactional entity having recently come into question (Pellegrinelli and Garagna, 2009) this expanded role may go some way to reaffirm the relevance and value of the PMO existing as an integral part of the operational structure of a lifecycle-based organisation. Here additional research is required to investigate the nature of other interface gaps and other lifecycle effects and how these can be managed.

Third, with these avenues identified for an expanded role of the PMO progress can be made towards understanding how project management and operations management can be more effectively integrated (Maylor et al., 2015). Ultimately this research would seek to understand how the PMO can be established as a 'Function' in its own right (Aubry et al., 2012). As work on the PMO as a Function is still embryonic there is much scope for additional research to investigate how the PMO can work as a feature of organisational structures and tackle the apparent temporal paradox that exists between current understandings of the project as a temporary entity and the Function as a 'permanent' feature of organisational structures. This avenue of research is especially interesting when considering the reach of its outcomes. These will be applicable to all industries that must manage longitudinally across lifecycle interface gaps and at the same time deal with the issues of integrating the permanent operational aspects with the temporary project aspects of the business.

Therefore, taken as a whole, this work provides an additional avenue of investigation to address the emerging need for a more plural understanding of project management (Whitty and Maylor, 2009) and of product lifecycles.

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