

PROJECT MANAGEMENT LESSONS LEARNED

“THE ELEPHANT IN THE ROOM”

ABSTRACT: A significant challenge for government and business project delivery organisations is to ensure that lessons are learned and that mistakes of the past are not repeated. This study has established that project, programme and portfolio management lessons learned methods vary significantly, implementation is inconsistent and fails to deliver results. The study used a prominent inductive, qualitative multiple case study approach representing the phenomenological paradigm of realism. Research data was collected from participating organisation's, open sources and via the freedom of information process. There is a significant amount of literature published on lessons learned, and refinement of the methods to date has failed to deliver the step change that is required. A decision now exists for the P3M community on whether to accept this direction of travel or assess whether a change in approach can deliver a measurable benefit that enables investment in a new framework. The study proposes a Leveraging Experience conceptual framework as a viable alternative approach.

Keywords: Lessons Learned, Project Management, Knowledge Management, Organisational Learning, P3M, Leveraging Experience

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1 Introduction

The study is concerned with the effectiveness of lessons learned systems within a project, programme and portfolio management (P3M) delivery environment. The need to learn and apply lessons from project delivery is well researched. The project management literature pays little attention to the effectiveness of the lessons learned process (Duffield & Whitty, 2015; Patton, 2001). Instinctively, it is evident that future projects will benefit from leveraging the experience of the past (Burr, 2009; Shergold, 2015). Yet it remains a major impediment for the P3M profession, where organisational learning from projects rarely happens, and when it does it fails to deliver the intended results (Atkinson et al., 2006; Keegan & Turner, 2001; Kerzner, 2009; Klakegg et al., 2010; Milton, 2010; Schindler & Eppler, 2003; Shergold, 2015; Williams, 2008). In project management, lessons learned is the 'elephant in the room', that needs to be acknowledged and discussed. The lessons learned 'elephant', is reinforced by project management literature. Milton (2010) highlights a significant dissatisfaction with project lessons learned processes. Lessons from projects might be identified, but not many are learned when it comes to picking up on early warning signs in problem projects (Klakegg et al., 2010). Out of 74 organisations that attempted lessons learned processes, 60 per cent were dissatisfied (Milton, 2010). In another study, 62 per cent of 522 project practitioners responded that they had a process for learning lessons, and of that only 11.7 per cent followed the process (Williams, 2007). Furthermore, while the lessons learned process is accessible, it fails to deliver the intended results as lessons are identified and are often not followed through and integrated into the organisation (O'Dell & Hubert, 2011a).

Following this introduction, the remainder of the paper is organised as follows. We commence with identifying the research problem, review the literature, discuss and reflect the current practice of the research problem. We then identify the research gaps, revisit the research problem, develop the research proposition and associated research issues. The next few sections describe the research methodology, develop an initial conceptual framework and describes the research cycle. The results and findings based on the initial conceptual framework are provided followed by a discussion section that answers the research issues. The conceptual framework is revised in line with the results and findings. Finally, the last sections outline the limitations and challenges, future research and conclusion.

2. Research Problem & Literature Review

There is a general trend of project organisations failing to learn from their past experiences while at the same time being surrounded by lessons learned models and guides, and opinions on how to apply them (Brouwer, 2011; Schindler & Eppler, 2003; Shergold, 2015). There is a significant variance in how lessons are identified, captured and leveraged while notwithstanding significant spending on knowledge management (KM) initiatives (Ajmal et al., 2010). However, many organisations lack the expertise and fail to learn from past projects and often are found to be reinventing the wheel (Ajmal et al., 2010). KM is the mixture of several disciplines; organisational theory, management theory, theory of action, sociology of knowledge, cognitive science, information systems theory and many others (Lange, 2006). KM, therefore, lacks an agreed theoretical basis, which provides a challenge to the researcher. There is a wide range of research that indicates that an organisation's ability to learn lessons from project delivery is a challenging problem.

Within the public sector, there are many examples of lessons not being learned. The Australian State Victorian Government Ombudsman examined ten major ICT business transformation projects during 2011 and identified that despite the extensive guidance, reports and literature available, agencies are still making the same mistakes around planning, governance, project management and procurement (Brouwer, 2011). The Queensland Health Payroll System Commission of Inquiry highlighted that problems from the Queensland Health payroll project (the worst failure of public administration in Australia) "were known to be ones not uncommon in large government projects of this kind. The neglect of them, in this case, is cause to think it is likely the lessons will again be ignored" (Chesterman, 2013, p. 219). In 2015 the Australian Government delivered learning from failure report highlighting why large government policy initiatives have gone so badly wrong in the past and how the chances of success in the future can be improved (Shergold, 2015).

In 2015 the Scottish Parliament investigated the lessons learned from the delivery of the NHS24 programme, highlighting a series of failures. In 2017 the Scottish Government appointed an inquiry into the Edinburgh Trams project exploring why it "incurred delays, cost more than

originally budgeted and through reductions in scope delivered significantly less than projected" (inquiry website) with the cost of the inquiry alone extending to over £8m (Secretary, 2018). In 2017 the UK National Audit Office published a framework to review programmes, and they commented that 'we agree that there is insufficient learning from past failures in project delivery'(Gordon, 2017, Comment 2). However, although the UK National Audit Office can facilitate, it is the responsibility of Government Departments to leverage the experience, and they struggle to learn from experience, particularly when it is outside of departmental boundaries.

2.1 Lessons learned

Lessons learned is perceived as a knowledge management method (Association for Project Management, 2012). Noting the potential rate of change in technology, breadth, scope, integration challenges of projects is it likely that a project manager will ever possess the range of experience required to deliver their role? Is the challenge one of ensuring that the project managers have all the knowledge they need to deliver projects or whether project managers have the core hard and soft skills needed to deliver projects, supplemented by an ability to leverage and apply relevance experience while simultaneously balancing constraints within an evolving environment? O'Dell and Hubert (2011b, p. 69) stated that the lessons learned approach typically focuses on a few key questions:

- What was supposed to happen?
- What actually happened?
- Why was there a difference or variation?
- Who else needs to know this information?

The major challenge is to then get employees to participate and reuse the captured knowledge "lessons learned" (Milton, 2010; O'Dell et al., 1998; O'Dell & Hubert, 2011b).

The literature on the lessons learned process model provides many variations on essentially three process phases (Williams, 2007). The three phases of practical lessons learned process model are; creating, dissemination/transferring and application. The literature on knowledge identification and creation mention several ways project temporary organisations or individuals reflect on their experiences. Standard techniques are: lessons learned sessions; after-action reviews; project debriefings; close out meetings; post project appraisals/reviews; case study exercises; project reviews; project histories; project health checks; and project audits (Anbari et al., 2008; Bakker et al., 2010; Busby, 1999; Koners, 2005; Maqsood et al., 2004; Reich et al., 2008; Schindler & Eppler, 2003; Von Zedtwitz, 2002; Williams, 2007). Each method has many different features and characteristics. However, they all essentially capture-disseminate-apply knowledge. Literature reviews on knowledge application often state

that a significant effort, commitment, understanding of people behaviour is required for both the organisation and individuals, as this is the area where the process typically breaks down and fails (Duhon & Elias, 2008; Keegan & Turner, 2001; Williams, 2007, 2008).

2.2 Project organisations require new methods and practices for lessons learned

The lessons learned and best practice experiences of an organisation should be integrated with project management (Lindner & Wald, 2011; Maier et al., 2016). The dissemination and application of lessons learned through projects are critical to organisational programmes and projects achieving success (Disterer, 2002). Carrillo et al. (2013, p. 573) states

Companies may need to address the questions of 'Do lessons learned address objectives at both the project level and corporate levels?' 'Are tools and techniques used appropriately?' 'Do our lessons learned processes address the problems they are designed to solve?' The current lessons learned practices may not be geared to solve these problems, perhaps reflected in the desire for alternative tools and techniques.

Lindner and Wald (2011) point out a gap in project management practice and suggest there is a need for more research in understanding the role KM plays in project management methodologies. Neef (2005) identifies an integrated knowledge and risk management approach where organisations need to capture knowledge as in lessons learned and then apply the knowledge learned using risk management and decision support system techniques to avoid the mistakes of the past and improve the performance of projects and the organisation. Williams (2008, p. 262) also argues that there be a need for "wider research into how lessons [from projects] can be disseminated throughout an organization and incorporated into organizational practice." Moreover, as Wideman (2011, p. 1 emphasis added) an international project management leader puts it:

Why is it that we do not usually make a good job of capturing lessons learned and past experiences, to say nothing of project management wisdom generally from our elders? I suggest that we have two major challenges: First is that in spite of all the technology that is available to us today, we have not yet found a presentation format that captures the essence of this wisdom in a way that is relevant to future usage, readily searchable and easy to store. That is to say, we need an archive that is user-friendly and commonly accepted. Secondly, we have a serious cultural problem. With the advertising market continually shouting "new and improved", who wants stuff that is "old hat", "yesteryear"

and "when were you born?" Each new generation naturally thinks it knows best, is reluctant to take advice and besides, prefers to make its own mistakes. Isn't it more fun that way, to enjoy a "voyage of discovery"?

Let's face it, didn't we too behave the same way when we started? And this in spite of the fact that the elements of project management were evident at the time of building the great pyramids of Egypt and, for all we know, in building Stone Henge also. And so, until these two things change, we are probably condemned to continue to throw away the valuable resources that you describe, just as today's society happily discards its recreational toys and gadgets long before they are worn out. Indeed, if it were not so, that could mean that there were a lot fewer projects and our economy in even worse shape than it is now.

Gharaibeh (2014, p. 36) case studied two organisations and found "surprisingly, that there is no incentive for learning in the organisation." This research outcome highlighted that current business models in project-based organisations are centred around project billable hours with a focus on short-term profit instead of long-term improvement. For some project-based organisations, mistakes and changes lead to more studies, more design alternatives, which means additional revenue. Clearly, there is no incentive to have a lessons learned capability. To achieve significant improvements in organisational project learning will require radical changes to the structure of the business model.

2.3 Systemic Lessons Learned Knowledge (Syllk) model

In line with a new methodology for lessons learned that is based on complex adaptive systems theory and capability networked the Syllk model (**Figure 1**) represents the various organisational systems or functions (in terms of elements) that collectively drive the overall behaviour of the organisation. Where the Syllk model stands alone, is in the systemic coupling or relationships of systems and not the systems themselves (Williams, 2004). As a result, the Syllk model enables individuals (the people elements), systems and organisations to exhibit intelligent behaviour in a dynamic KM environment. Conceptually the Syllk model is a reverse relationship adaptation of James Reason's (1997, 2000) Swiss cheese model for safety and accident prevention. The model replaces Reason's (1997) defence layers with the organisational elements of learning, culture, social, technology,

process and infrastructure. The reverse relationship refers to the fact that the open holes (facilitators) in each element represent the various facilitators (lessons learned practices) within each of those elements that need to be aligned to enable the effective dissemination and application of the identified lessons. The Syllk model is grounded in the literature of Duffield and Whitty (2015, 2016b) and Duffield (2016; 2017).

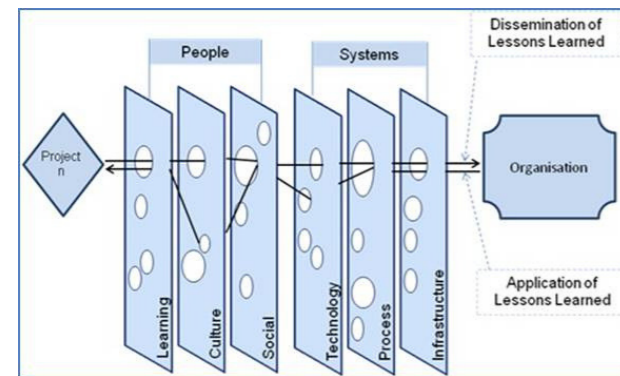


Figure 1. The Systemic Lessons Learned Knowledge Model
Source: (Duffield & Whitty, 2015)

Williams (2007, 2008) provides an extensive relevant literature review based on a Project Management Institute (PMI) grant to research current practices for lessons learned in the project management field. Williams (2007, 2008) literature review focuses on, motivation, concepts, current situation, creating knowledge, transferring knowledge and provides a solid foundation to build further on. These initial literature reviews were the key drivers for the deductive content analysis that developed the earlier SLLCK model (Duffield & Whitty, 2012, 2015).

2.4 The current practice of Government published lessons learned

The Australian Government regularly published lessons learned from its gateway reviews. The first published edition was August 2007 and the final (4th) edition in July 2012 (Financial Management, 2018). The Department of Finance integrates lessons learned with good practice. A report has not been published since 2012; however, in its current format, there are diminishing returns. There are only so many ways that an organisation can reiterate good practice and if it does not engage the reader, then it will not get read (Patton, 2001). The New Zealand (NZ) Government publishes a summary of lessons learned from

every fifty gateway reviews, which is approximately every two years. The last published report was July 2017 (Treasury-NZ, 2017, 2018). The Australian Government reports summarise by theme and gateway. They integrate established a good practice with specific examples of lessons identified by the assurance reports. The under-utilisation of Gateway reviews for ICT investments is attributed to the fact that agencies 'do not give enough attention to project assurance as part of their project planning or project management [Finding 33] (Committee, 2016, p. 77). The NZ Government reports take a similar approach, but with a more comprehensive overview of trends, analysis of themes and specific recommendations. Treasury-NZ (2017, p. 32) report commented that

Two percent of all recommendations (11 recommendations) focused on projects learning from their errors and successes and ensuring these learning are actioned and made available to others, whether in the same project or in later projects or tranches. Learning from their own or other projects' lessons continues to be an area of weakness in major projects. Capturing of lesson learned is often overlooked, or done once – often too late – and then not followed up. It is important that lessons are sought and documented early and often, and not simply filed but actively actioned and made available to later phases of this programme and to other projects in the agency and sector.

The Northern Ireland Government regularly publishes the lessons extracted from the gateway and other assurance reviews, with the last document published in May 2017 (Gateway, 2017). The Northern Ireland Government also publish a list of all lessons learned from 2008-2017, with additional reports by themes. The Audit and Public Accounts Committee consistently reports the failure of public sector programmes and projects to learn lessons from previous project experiences (Finance, 2018). Audit Scotland published a report in May 2017 on the lessons learned from public sector ICT projects (Audit-Scotland., 2017). The Scottish Government has a webpage on lessons from project management, however, in 2017 the Government removed references to specific lessons (Scotland, 2017). The United Kingdom (UK) National Audit Office publishes reports on specific projects and identifies lessons. However, it is the responsibility of individual departments to ensure that lessons have been learned. There is limited follow up to ensure that recommendations have been actioned and ensure that departments continue to have an enquiring mind. The UK's Office for Government and Commerce, where responsibility for gateway assurance reports was transferred to the Infrastructure Projects Authority have supported the delivery of hundreds of Gateway reviews since 2006. The author of this paper has tried to gain

access to the core data that underpins these reviews via FOI requests but has been unsuccessful to date. It does not publish insights from this analysis. The United States (US) takes a similar approach to the United Kingdom (UK) and regularly publishes reports from the Government Accountability Office. The government also has a range of other lessons learned systems ranging from the NASA lessons learned information system, the Centre for Army Acquisition Lessons Learned and the Department of Energy Lessons Learned. However, all of these are overshadowed by reports from the GAO on the NASA Lessons Learned Information System that highlights many of the challenges with centralised repositories.

2.5 Reflection of lessons learned

The need to learn and apply lessons from programme and project delivery is well documented and researched both in academic and non-academic literature, but the scope of research that demonstrates the effectiveness of the lessons learned process is limited. The study of the current practice of Government published lessons learned highlights that they are all trying to establish a body of knowledge for how to successfully conduct a project. However, for a seasoned project professional many of the reports repeat the established body of knowledge and are regarded as anodyne. Many of these factors have been known for up to thirty years, thus far project delivery performance has mainly remained stagnant for 7 years, or

over 20 years if we consider the productivity of the construction industry (Changali et al., 2015; Jordan et al., 1988; PMI, 2017, 2018; Turner et al., 2000). The lessons learned to provide little additional information to help the project manager to make informed decisions in real time. In the worst case, they degenerate into a checklist of considerations that a project manager must show some form of sign-off (Catchpole & Russ, 2015; Gordon et al., 2013). If we perform our own after-action review 'reflection activity' and compare the current state of P3M with the UK Department of Health report 'An Organisation with a memory' (CMO, 2000), we would learn that little has changed. The Department of Health report was aimed at primary health care over 18 years ago. Sujan (2015) reports that there are still barriers and key organisational learning (lessons learned) issues 12 years since the tabled Department of Health report. **Table 1** summarises the key recommendations from the Department of Health report which is relevant to P3M based organisations. The challenge that Health Care, P3M based organisations and researchers are facing is to find an alternative approach to organisational learning (Sujan, 2015).

Table 1. P3M reflection of Dept. Health 'An Organisation with a memory' findings

CMO (2000)	Department of Health report findings relevant to P3M Organisations
(p. x 16)	Systems vary too in the degree to which the information collected is subject to analysis with the aim of promoting learning
(p. xi 17)	The NHS record in implementing the recommendations that emerge from these various systems is patchy. Too often lessons are identified, but true 'active' learning does not take place because the necessary changes are not properly embedded in practice.
(p. 68 4.58)	Acting on lessons learned identified: It would be quite wrong to conclude that the NHS as an organisation is incapable of learning and improving, but the evidence suggests that learning generally takes a long time and that implementation of lessons can be very patchy. We have already highlighted in case studies specific kinds of problem or incident which have recurred time after time even though they have been identified as hazards.
(p. 74 5.4)	There is no consensus on what to report.
(p. 74 5.4)	There are different, and potentially conflicting, views on the purpose of adverse event reporting systems.
(p. 74 5.4)	There are no proper linkages between reporting systems.
(p. 75 5.5)	Best use is not made of available information.
(p. 75 5.5)	The analysis does not reliably take place across different systems.
(p. 75 5.6)	The threshold for inquiries or investigations is unclear.
(p. 76 5.6)	Inquiry recommendations are not always sufficiently helpful or focused.
(p. 76 5.6)	Implementation and follow-up of recommendations are patchy.
(p. 76 5.6)	There is no systematic mechanism for sharing more widely the learning from individual local adverse event investigations.
(p. 77 5.7)	Information is difficult for staff to access.
(p. 77 5.8)	There is too often a 'blame' culture.
(p. 77 5.8)	No account is taken of 'near misses'.
(p.78 5.9)	Implementation of recommendations takes a long time.
(p. 78 5.9)	There is little or no systematic follow-up of recommendations.
(p. 78 5.9)	There is a lack of clarity about priorities for improvement.

2.6 Gaps (Issues) in the literature

The review of the literature found there is a considerable amount of research literature focused on lessons learned, knowledge management and organisational learning (Srikantaiah et al. 2010). Lambe (2014, p. 3) reports that “there are still very few institutional mechanisms for leveraging evidence from KM practice in KM research, or for testing theoretical postulates in practice.” Duffield (2017) reviewed 2015 and 2016 associated literature that reinforces the gaps associated with the research problem and the Syllk model.

When undertaking case study research “the gaps are not expressed as precise, testable, closed yes/no propositions or hypotheses, but as general broad, open research issues” (Perry, 1998; Yin, 1994, p. 21). For this study ‘Issue and Research Question’ have the same association and ‘Research Issue’ will be used.

Gap 1: As highlighted in this literature review and supported by Williams (2007, 2008) it is clear that more research is required to understand why the dissemination and application of knowledge/lessons learned in organisations are ‘not effective’ (Disterer, 2002; Duhon & Elias, 2008; Fernie et al., 2003). Lindner and Wald (2011) point out a gap in project management practice and suggest there is a need for more research in understanding the role KM plays in project management methodologies. Williams (2008, p. 262) also argues that there be a need for “wider research into how lessons [from projects] can be disseminated throughout an organization and incorporated into organizational practice.”

Gap 2: The gap between the lessons learned theory and lessons learned practice, has significant interest and discussions in the various media platforms which support the project management domain. Single loop learning is not working as the results continue to defy expectations in that it questions the framing and underlying systems that are expected to deliver the results (Dalcher, 2016). If we apply the ‘theory, practice, results double loop’ learning cycle, the double loop element (the change element) which is the core of this paper – (Figure 2) “challenges and questions the framing, assumptions and approaches required to commit to a more fundamental form of learning and improvement” (Argyris, 1999; Dalcher, 2016 p. 806).



Figure 2. Lessons learned theory, practice results in double loop learning
Adapted from Dalcher (2016, p. 806)

3. Research Problem revisited

The review of the literature highlights the serious problem where project organisations are surrounded by lessons learned models, guides, and opinions on how to apply them and they are still failing to learn from their past experiences. The organisation’s ability to learn lessons from project delivery is clearly a challenging problem to resolve, so are we approaching the point where we abandon conventional approaches because they are failing to deliver results? Could the P3M profession consider an alternative approach?

4. Research Proposition

Despite the importance of lessons learned to organisations and the P3M environment, the review of the literature has shown that the P3M environment is not operating at a mature level that is expected in our P3M methods and practices. The literature advocates that lessons learned is the ‘elephant in the room’, that needs to be acknowledged and discussed. The lesson learned process is embedded in many project management standards, frameworks and bodies of knowledge, so to question the effectiveness of the process is particularly challenging for the project management community that there is a serious issue being ignored. This study is structured around the following Proposition:

P1: P3M lessons learned practice continues to defy expectations, there is a need to refine, or amend the theory, frameworks and methods behind the practice.

5. Research Issues (Questions)

The following proposed research issues support the research proposition P1.

Issue 1 (Gap 1): How have P3M based lessons learned methods and practices failed to deliver?

Issue 2 (Gap 2): How can the P3M profession change the current lessons learned practice and still enable a P3M organisation to learn from past experiences?

6. Research Methodology

A prominent inductive, qualitative multiple case study (case research; case analysis) representing the phenomenological paradigm of realism was used in this study. Over the last few decades, there has been a growing interest in realism and qualitative research within the business, management, social and administrative sciences (Cepeda & Martin, 2005; Flyvbjerg, 2011; Sobh & Perry, 2006). Furthermore, realism is a “growing movement transforming the intellectual scene in management research” (Sobh & Perry, 2006, p. 1199). **Table 2** presents the philosophical assumptions that support paradigm realism (may also be expressed as Postpositivism (Guba & Lincoln, 1994)).

The aim of the realism paradigm is to generalise to theoretical propositions and strive for a particular set of results to a broader theory (Firestone, 1993; Yin, 1989, 1994), a form of analytic generalisation. To generalise to a theory is providing evidence that supports a theory but not necessarily proves it definitively (Firestone, 1993; Perry, 1998). A realist believes that there is a real world out there to be discovered (Sobh & Perry, 2006). Bonoma and Wong (1983) stated that case study research is particularly appropriate for sticky, practice-based problems.

For the above reasons, realism is the preferred paradigm for case study research (Perry, 1998). According to Cepeda and Martin (2005) a comprehensive case study should have three main elements: 1) a conceptual framework; 2) case study research cycle and 3) theory building, where the conceptual framework is challenged and confirmed or revised and updated based on the case study findings.

7. Initial (Preliminary) Conceptual Framework

7.1 Prior theory

Realism researchers enter the research stage with prior theories. Sobh and Perry (2006) describe how other researchers usually experienced aspects of that reality associated with the research in question. Realism researchers support Miles and Huberman’s (1994, p. 17) advice,

that a preliminary conceptual framework about the underlying structures and mechanisms should be developed from the literature and/or from people with experience of the phenomenon, before entering the field to collect data – at the outset . . . [develop a] rudimentary conceptual framework .

The prior theory provides a focus to the data collection activity in the form of research issues and the development of an Initial Preliminary

Table 2. Philosophical assumptions of the paradigm positivism and realism

Element	Paradigm Positivism	Paradigm Realism
Ontology [ontology is “reality”]	Reality is real and apprehensible	Reality is “real” but only imperfectly and probabilistically apprehensible, and so triangulation from many sources is required to try to know it
Epistemology [epistemology is the relationship between that reality and the researcher] Common methodologies [methodology is the technique used by the researcher to discover that reality]	Findings true – the researcher is objective by viewing reality through a “one-way mirror.” Mostly concerns with testing of theory. Thus mainly quantitative methods such as survey, experiments, and verification of hypotheses Deduction approach	Findings probably true – the researcher is value-aware and needs to triangulate any perceptions he or she is collecting Mainly qualitative methods such as case studies and convergent interviews Case study research includes some deduction based on prior theory, although inductive theory building is more prominent

Source adapted from Sobh and Perry (2006), Perry et al. (1999) based on Guba and Lincoln (1994)

Conceptual model, that follows the literature review. The conceptual framework represents the researcher's current understanding of the research topic which in turn sets out the boundaries to be explored.

An Initial (Preliminary) Conceptual Framework is shown in **Figure 3**. The framework has been developed from the literature review and consists of the current known lessons learned policy, methods and practices, and for Government organisations the alignment to Assurance and Gateway reports.

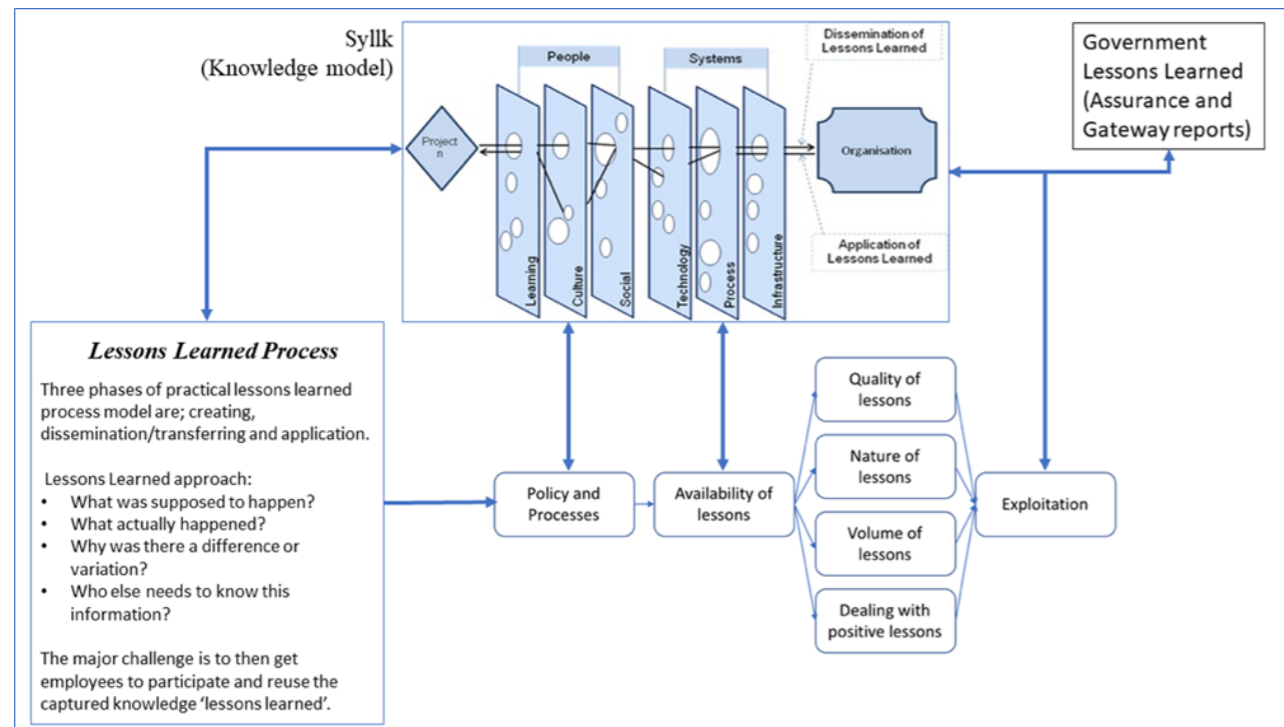


Figure 3. Initial (Preliminary) Conceptual Framework

7.2 Triangulation

McNiff & Whitehead (2011) defined triangulation as cross-checking the existence of certain phenomena and the veracity of individual accounts by gathering data from some informants and some sources to produce as full and balanced study as possible. Triangulating is one of the important steps in building trustworthiness and is a major strength of case study data collection (Yin, 1989). As the research makes progress and information tabled, steps should be taken to validate against another source. No single article of information ought to be considered unless it can be triangulated (Lincoln & Guba, 1985). This study builds on a series of freedom of Information (FOI) requests submitted to different parts of the UK government during 2017. The study had multiple case studies, multiple data sources and multiple data collection methods implemented. Deductive reasoning facilitated the cross-case analysis of the multiple case studies and evidence from internal records, freedom of

information (FOI) requests, publications, public domain material and personal observations/reflections as noted in a diary log book. Peer researchers' interpretations also provided different perceptions following analysis of the data. Public testing of the results with a diverse audience (London Project Data Analytics Meetup, two APM events and a PMI UK chapter event) has provided consistent feedback in agreement with the results.

8. The Case Study Research Cycle

The case study research cycle of 1) Plan, 2) Data collection, 3) Case Analysis and 4) Reflect are ongoing iterative tasks. Consequently, the cycle does not follow a set sequential pattern (Cepeda & Martin, 2005). For this study, we selected a multiple case study approach which provides a level of external validity to the quality of the research. The case analysis phase applied the qualitative content analysis process.

The development of the Conceptual Framework (**Figure 4**) was derived from the study results and findings based on the Initial (preliminary) Conceptual Framework (**Figure 3**). For each of the case analysis, the qualitative data collected was evaluated using a general inductive approach to help in identifying what is working well and what needs improving (Elo & Kyngäs, 2008; Lincoln & Guba, 1985; Patton, 1990; Thomas, 2006). The steps of inductive content analysis are open coding, creating categories and abstraction (Elo & Kyngäs, 2008; Thomas, 2006). The abstraction activity together with the application of cross-case analysis formulates and groups categories. The abstraction process continues as far as is reasonable and possible (Elo & Kyngäs, 2008; Guba & Lincoln, 1994). The research issues supported by evidence through reflection activities guided the case data analysis as did the existing literature to enable the generation of a new conceptual framework (Figure 4) (Bazeley, 2013; Eisenhardt, 1989; Miles & Huberman, 1994).

8.1 Data Collection

Data for this study was collected from May 2017 to February 2018. In 2017 a series of freedom of information requests were submitted to 25 different government departments with the intention of collating, integrating and making available to the public the world's most extensive dataset of a government project and programme-based lessons learned and associated insights (**Table 3**). Without knowing whether the lessons were centrally held or federated across projects, the initial request sought access to their dataset of lessons and in some instances, gateway assurance reports. The result was four full positive responses, with eight more responses following a short period of clarification and two partial answers. Some departments stated that the time required to collate and redact the centralised information would exceed the cost limit defined in the Act, or that the information was not available in a centralised form. A number of the FOI requests were modified to name specific projects to fall within the cost limit and were resubmitted. Some were escalated for independent review, which generated another four responses with the remainder being escalated to the Information Commissioner. Four additional FOI requests were submitted to specific departments to gain access to their lessons learned policies and processes, with two additional follow up requests and process documentation provided informally from another. Where possible brief discussions were held with department staff. The remaining data was sourced from the public domain and private sector organisations. Interviews were held with the private sector organisations.

Department/Agency (UK)	Process Response	Quantity of lessons	Case Analysis	Request declined on the basis of the time required to collate the lessons
Dept 1	Y			Declined
Dept 2	Y			Declined
Dept 3	Y			Declined
Dept 4	Y	432	Low-Medium	
Dept 5	Y			Declined
Dept 6	Not asked (1)	896	Low-High	
Dept 7	Not asked (1)	804	Low-Medium	
Dept 8	Not asked (1)			Declined
Dept 9	Not asked (1)	92	Medium-High	
Dept 10	Not asked (1)	64	Medium	
Dept 11	Not asked (1)			Declined
Dept 12	Not asked (1)	103	Low	
Dept 13	Not asked (1)			Declined
Dept 14	Not asked (1)			Declined
Dept 15	Y	206	Low-Medium	
Dept 16	Not asked (1)	79	Low	
Dept 17	Not asked (1)	49	Low	
Dept 18	Not asked (1)	10	Low	
Dept 19	Not asked (1)	67	Low-Medium	
Dept 20	Not asked (1)	405	Low	
Dept 21	Not asked (1)	168	Low-Medium	
Dept 22	Not asked (1)	48	Low	
Dept 23	Not asked (1)	36	Low-Medium	
Dept 24	Not asked (1)			Declined
Dept 25	Y	6000+ (2)	Medium	
Private Sector Org 1	Discussion Only			
Private Sector Org 2	Discussion Only			
Private Sector Org 3	Discussion Only			
Private Sector Org 4		220		
Low: Superficial. Anodyne.				
Medium: Some insights but lacks rigour. Users would struggle to exploit them.				
High: Forensic. Well defined. Some root causes. Actionable.				
Process response: We sought responses from 6 organisations and after some iterations, received responses from all of them.				
(1) Due to FOI time constraints, the process related material was not requested.				
(2) Lessons captured not 'learned.'				

Table 3. FOI Data collected (May 2017 to February 2018)

9. Results and findings

The following section provides a summary of the preliminary results and findings associated with **Figure 3** Initial (Preliminary) Conceptual Framework.

9.1 Policy and (lessons learned) processes

Private sector Org 1 had a lesson learned process but acknowledged that the analysis was superficial and added insufficient value. Org 2 had mandated lessons learned processes in the past but had struggled to leverage the value from the investment. Some government organisations who responded to the FOI requests have invested millions of UK Pounds in developing their lessons learned data sets, with costs including staff, supplier and facilitation time, systems and associated analysis. However, none of the government organisations examined appeared to have the data required to quantify the magnitude of the return on investment. As funding pressures build, lessons learned processes compete for resources with parallel initiatives. In three major government organisations, lessons learned systems were all under considerable cost pressure, with some collapsing entirely to enable funding to be reallocated within the organisation. Department 1 did not have a process for lessons learned and was left to the discretion of individual projects, with the obvious consequence of variability in approach. They advised:

"[Dept 1] does not have any policies or processes on lessons learned. Lesson learned methodology is standard Programme and Project Management practice which programmes and projects deploy as they see fit."

Department 5 with billions of pounds of annual investment had a policy that mandates lessons learned processes and that the results of this analysis should be collated centrally. When an FOI request was submitted to access this centrally held information the authority advised that

"I can confirm that no information in the scope of your request is held. ...you may find it helpful to note this is due to there being insufficient numbers of evaluations forwarded to [central body] for collation and analysis of key lessons."

A sub-department of dept 5 provided a strategy document that was developed in 2015, summarising that "currently there is no consistent and coherent approach to learning from experience across the sub-department." We have

struggled to gain access to lessons learned evidence from this department, but discussions with practitioners from within the department indicate that the challenges with leveraging this experience continue.

Another sub-department of dept 5 developed a strategy document in late 2017 summarising that pockets of good practice exist, while in other areas there is little evidence that learning from experience is taking place. Their strategy proposes to drive a culture to support learning from experience, but there is limited evidence regarding how this will be affected. Sub-department of dept 5 created an environment in which it 'expects' that lessons learned are captured, shared and analysed before, during and after project closure, extending into business as usual and as capabilities go out of service.

Other departments had written policies and were not enforced. At the other end of the spectrum, one department had distinct actively followed processes. The processes generated thousands of lessons which were available within a SharePoint database. There was an evident commitment to capturing lessons learned.

However, this was primarily due to the commitment of a key individual. When funding pressures emerge, the team supporting this activity was reduced from 4 to 1, with this individual eventually being redeployed. Although they identified lessons learned, it was not evident how the lessons were being leveraged, other than by project managers conducting keyword searches. A deep dive was carried out into one theme within the lessons dataset, and this indicated that savings of between 10- 30% could occur in some areas, but this was not followed up due to resources directed towards a corporate transformation programme.

The UK's £14.8 billion Crossrail programme is Europe's largest infrastructure project. As part of the business case, the team had a mandate to deliver a learning legacy from which the rest of society could benefit. The result was hundreds of documents published on how the various strands of the programme were executed, spanning process documents to technical know-how. By way of example, Crossrail's approach to innovation is now being developed further on some other major infrastructure programmes such as Thames Tideway and High Speed Two. Having a public mandate to develop a learning legacy enables resources to be devoted to documenting the experiences, but there is limited evidence to substantiate whether the information has successfully been utilised.

A major private sector organisation had a policy, encapsulated as a contractual requirement on their suppliers, for all projects to produce lessons learned reports. Although the process successfully generated a comprehensive body of insights, it became overwhelming for the organisation to handle. Reports were filed away and were difficult to discover. Noting that the organisation had to pay for the publication of these reports, the policy was subsequently scaled back.

9.2 Availability of lessons

The results illustrated a significant variation across departments. Despite over eight months of repeated requests and appeals, 3 government departments have not provided any information and have actively challenged the release of lessons learned and assurance reports, despite cost increases of up to 2000%. There is a constant tension to release data by public accountability and the desire to prevent reputational damage.

Some departments have struggled to identify their lessons or have suggested that the time needed to pull them together would exceed the 24 hours permissible under the FOI Act.

Dept 10 commented: *"...would require Dept 10 to go through 7 years of SharePoint records and then identify the necessary reports which contained the lessons learned information. There are also other Change and Transformational programmes that have been undertaken by other teams across Dept 10 who will have a similar paper and electronic records."*

Dept 2 replied, *"...our estimation that locating, retrieving and extracting the lessons data from centrally held information on projects/programmes (over 50 in number) will take over 100 hours of work."*

Illustrating that it can take up to three weeks to collate the information highlights one of the challenges in how organisations struggle to learn lessons. In comparison, other departments have between two hundred and thousands of lessons in structured databases that are accessible within corporate intranets. By collating the data from the FOI process with a dataset of publicly available material (Data-sets available to the public were sourced from Australian, Ireland, New Zealand, Scotland and the United States of America Government departments and agencies), we have acquired a dataset approaching 20,000 separate lessons as of August 2018.

9.3 Quality of lessons

Recorded lessons vary significantly in quality. In one instance of a failed £100m project in Dept 11, a lesson on stakeholders was documented as 'stakeholders'. Another project described a lesson as 'benefits clearer'. A department that had a project with a documented cost increase of £2.6bn provided a set of lessons amounting to a page of A4. Conversely, for Dept 14 a £50m failed project had produced a 96-page report that forensically examined the lessons learned. The initial FOI request refused access to this report. Following an appeal, access was then granted. Had access not been granted this report would have remained buried within the project or distribution

constrained within a small circle of people. It is an excellent report that has value far beyond the boundaries of the project or the department. However, even this report lacks the breadth of information required to leverage the full value of the experience because it lacked insight into causes, trigger events, the impact of specific lessons, the correlation between lessons.

There is a lack of consistency in the dataset collated related to the lesson. One organisation collated over twenty different fields of data for each lesson, but this often resulted in some fields not being completed. Another organisation provided hundreds of lessons, but there was a significant variance in the data fields, the degree of rigour and definition of the lessons. Dept 22 forwarded lessons learned from a review of a significant road building project. Thirty-three stakeholders received a predefined form, and 6 replies were received. A workshop comprising 16 people supplemented it. The template focused on the meeting, accommodation and meeting conduct, i.e. lessons learned from the specific meeting group, rather than the lessons learned from the investment of £47 million in the creation of a new highway. Another lessons learned report was much more detailed. However, it was difficult to understand how the report could be utilised. The report included statements such as 'flash reports and output data very useful; you can't do less when it comes to H&S; short/sharper briefings; more communication with the public about our success; needs confidence and bravery; more than just a road; make sure we focus on whole of life cost and the implications for budget'. There were some insightful comments such as '[Dept 22] would have liked a better understanding of the implications of the Side Road orders, their implementation and their involvement; Exemplar active travel measures' however these were lost within hundreds of comments.

From a sample of six road projects, only two had details. The insights were complex with hundreds of anodyne comments, one was about the conduct of the meeting rather than the project, another did not have any recorded lessons learned, and two were to be conducted in the next twelve months. The infrastructure investment amounted to £ billions.

9.4 Nature of lessons

The scope of the lessons identified from the FOI requests varies significantly.

The dataset is dominated by lessons on P3M, with much reiterating good practices captured within existing bodies of knowledge. The organisations with a more mature approach to lessons learned tend to capture a much broader scope of lessons. This increased scope includes technical lessons related to engineering or commercial challenges. As expertise grows, the lessons tend to become more forensic and specifically aimed at assisting those who may follow a similar path. Supply chain lessons captured were included. However, noting that most of a project investment is delivered by the supply chain, we would have expected a higher percentage of lessons from this community. However, multiple barriers prevented this, such as the need to protect their reputation and avoid openly sharing mistakes with an influential client; sharing good practice that may give the supplier a commercial advantage and, lack of commercial incentives to share lessons. Together, these factors tend to result in lessons learned from the supply chain degrading into anodyne statements that are difficult to leverage on future projects.

9.5 Volume of lessons

There is a significant amount of variability between departments on the volume of lessons. One department, which has thousands of lessons, experienced operational constraints with SharePoint which resulted in lessons archived on a periodic basis. Although an expert user can retrieve lessons, they are not discoverable by the general user. A minor operational constraint results in £100s millions of lessons now hidden away.

Other organisations have lessons in different formats, with different fields and level of detail. It becomes challenging for users to find them, understand them and extract benefit from them. Some departments have lessons scattered around divisions, where insights remain constrained to the immediate locality. They are not discoverable in other parts of the same department. There is no cross-government, sector, technology or industry-based dataset of project related lessons learned. As the volume of lessons grows, it should be easier to identify lessons which have context and insights which are relevant to the specific circumstances of the project. However, this benefit is offset by having to sift through thousands of lessons, many of which may be outdated. This challenge lies at the very heart of why a lessons database approach has failed to gain traction.

9.6 Positive lessons

From a sample of around 5000 lessons, approximately 20% were positive lessons. This percentage varies significantly by the organisation and the maturity in their approach to lessons learned. Although negative lessons learned have the potential to provide the project management community with useful data to underpin key investment decisions, careful thought on how positive lessons can be analysed is needed. Learning points are more naturally derived from problems in progressing the project, rather than from project successes (Newell et al., 2004).

The positive lessons varied from lessons that establish good practice for project delivery through to examples where teams have utilised the lessons learned process to bring visibility to the excellent work that they have done. The former should be extracted, identified as an exemplary, widely promoted within communities of practice. However, it needs to be moderated by the P3M centre of excellence otherwise those working on projects will promote their approach as 'best practice' without having the necessary breadth of examples to compare against. An example from Dept 22 is "*Community engagement at a new level; exemplar. Gave potential for even fewer objectors.*" The latter tends to be used to boost team morale, for personal promotion and for documenting hard-won project decisions. However, in the majority of cases, these positive lessons are difficult to leverage because they tend to reflect examples of pre-existing good practice. Another example from Dept 22 is "*Good engagement with key stakeholders early on kept them happy throughout the project.*"

When identifying lessons the project team may decide to exploit a variety of methods and practices including reflection; lessons learned sessions; after-action reviews; project debriefings; close out meetings; post project appraisals/reviews; case study exercises; community of practices; project milestone reviews; postmortems, project histories; project health checks; and project audits (Schindler & Eppler, 2003; Williams, 2007). The process of review and reflecting on team performance can deliver some benefits for team cohesion and personal learning. However, the facilitator of such a session should think carefully regarding whether others can leverage the experience.

Retrospectives can also form a vital component of an agile development methodology, identifying lessons learned for future iterations (APM, 2017). However, a retrospective typically reviews the last sprint or phase rather than reviewing the project in its entirety and assessing whether the development route provided the most optimal solution and whether it could be delivered more efficiently in the future. Release and project retrospectives bring perspective and should include people from across the organisation (including beta testing, shipping, and supporting the product) (Derby & Larsen, 2006).

9.7 Exploitation of lessons

Many of the organisations extracted their lessons from assurance and gateway reports. Although these reports provide useful guidance to the project manager and senior responsible owner, the commentary is not necessarily useful for other project managers. Statements directing priorities for action in the next phase are identified, and it can be difficult to differentiate between observations highlighting good practice and observations that if not addressed could result in project failure. Examples from Dept 22 include: "The impacts the project may have will be better understood by actively engaging and responding to stakeholders. Practical and targeted strategies aligned with the business case should be established to manage diverse stakeholder expectations, and a robust change control and decision-making framework would benefit the project." When lessons are extracted from assurance reports, it is not always clear what the target audience is for the lessons, how they will use them and whether they find them useful. We have identified 1000s of lessons where the use case is not apparent, and it would appear they were collated because the process demands it, rather than delivering a defined and measurable benefit.

Exploitation is also directly linked to project similarity. If an organisation has a pipeline of similar projects the opportunity to exploit the lessons is far greater than when a project is delivered once every 10 years. Our interview with Events Scotland helped to reinforce this point. Their approach to learning lessons was focused around shared learning with those who had held similar global events, such as the Commonwealth games. They would routinely attend the preceding event to capture as many insights as possible and also support learning on preceding events; an immersive peer assists process. They also conducted deep dives into specific themes such as transportation, security or ticketing, enabling them to cross-fertilise experience between large scale events.

Our analysis has identified that there is a fundamental difference between technical and project management lessons, yet the processes tend to treat them the same. Technical lessons emerge from a unique application, such as the installation of concrete rail infrastructure that is manufactured off-site. It provides access to insights accrued as a product of the engineering process.

Project management lessons, generally (there are exceptions), repeat recognised bodies of knowledge, such as the lack of risk management at the early stage of a project. For experienced project managers these insights are statements of the obvious. However, if a project manager had the insights to understand the types of challenges (and lessons) that a particular project is predisposed to, the window in which these challenges have the greatest impact and the potential scale of the impact, the project manager has the ability to make probabilistic investment decisions on different courses of action.

9.8 Application of the Syllk model

None of the case study departments / organisations had a knowledge management system linked with their lessons learned. The Syllk model can be integrated with existing department - organisation systems. The Syllk model provides answers to the research issues and learning barriers raised earlier by Gharaibeh (2014).

10. Discussion

10.1 Answers to the Research issues

In project management, lessons learned is the 'elephant in the room', that needs to be acknowledged and discussed. The lessons learned 'elephant', is reinforced by literature that indicates there is a severe problem to resolve, so are we approaching the point when we abandon conventional approaches because they are failing to deliver quantifiable results? Are lessons learned methods struggling to compete with parallel strategic objectives, hence, are failing to deliver corporate and governance benefit? The notion of project managers having to acquire infinite knowledge is a flawed one. Hence, we would argue that within the context of lessons learned in project management, the primary challenge is relevancy and prioritisation of action based upon insights derived from the projects circumstance and metrics. We will propose that the answer lies in the interconnections in the data and our ability to interpret them, rather than applying a recipe book of lessons identified (not learned).

10.2 Issue 1 (Gap 1): How have P3M based lessons learned methods and practices failed to deliver?

We have already identified the challenges with identifying early warning signs in problem projects (Klakegg et al., 2010) and that within Milton (2010) study, 60% of organisations that attempted lessons learned processes were dissatisfied. O'Dell and Hubert (2011b) highlight that lessons learned process fail to deliver because lessons are not followed through and integrated into the organisation.

When organisations invest in lessons learned initiatives the investment does not sit in isolation. The initiatives are in continual competition with parallel projects, each fighting for scarce organisational resources. Is the measure of success that lessons are integrated into the organisation or that the organisation can

demonstrate a return on investment that exceeds competing priorities? Very few organisations understand the project or organisational consequences of a lesson; indeed, there is limited research on the 'data' that is required to understand the return on investment of such a capability.

Without a tangible measurement of the value of leveraging, experience or lessons learned such a capability will always struggle against other initiatives and will ultimately be at the whim of the corporate governance sponsor. If the sponsor leaves the department - organisation, then there is a risk that the capability will be reduced in scope or deleted entirely. A common thread has emerged as a product of our FOI related discussions is that without a Sponsor the capability will not succeed. There is also a worrying trend within the UK for government departments to frustrate the release of lessons learned documentation. Real progress will only be secured when we can openly share this information for the benefit of society. Following an appeal to the UK Information Commissioner, we have recently successfully argued that the public interest of releasing lessons learned data outweighs any exemption arguments presented by the UK Cabinet Office. A LinkedIn discussion on this subject received 50,000 views demonstrating the high levels of public interest. These outcomes will enable access to the data, shine a light on performance and may begin to drive through transformational change.

In summary, from our case analysis, we find that cases are ill-defined resulting in lessons learned becoming a meaningless tick box process (Turner et al., 2000). Lessons are often poorly articulated and are anodyne (Williams, 2007). In the majority of cases, lessons lack the forensic insight required to enable those who follow to leverage the experience effectively. A lack of consistency in policy, procedures and methods, with some organisations leaving it to the discretion of the project manager is often the standard approach, along with no follow-up. Even at a macro level, the follow up to the issues identified as a product of an intervention or lessons learned review by the UK National Audit Office is at the discretion of the host department; it is not mandated. Actions are not independently verified. Some departments have thousands of lessons, but they lack the systems and capacity required to identify and extract insights relevant to the particular circumstances of a project. Adoption is inconsistent.

From the sample of projects that we have studied, combined with a review of thousands of publicly available lessons, in the overwhelming majority of cases project-based lessons learned methods have failed to deliver and are ineffective. They provide an illusion of learning from experience that is clearly misleading and furthermore there is no incentive for a group and organisational learning.

10.3 Issue 2 (Gap 2): How can the P3M profession change the current lessons learned practice and still enable a P3M organisation to learn from past experiences?

We would not advocate investing in project-based lessons learned environments as currently structured because they are consistently failing to deliver a demonstrable return on investment. In the majority of organisations, the approach is superficial, and it could be argued that the effort is better invested elsewhere. The P3M profession now has a decision to make; whether to accept defeat and accept that we are unable to leverage the experience from project delivery or build or explore a new approach.

The challenge for the public sector is whether they would be happy that the experience of past delivery is not adequately captured and acted on; would this be politically acceptable? When things go badly wrong, such as with the Edinburgh Tram Programme, public pressure results in an independent inquiry at the cost of over £7.2m and climbing; this is a lesson learned session on a large and costly scale (BBC, 2017). The official terms of reference for the Edinburgh Tram Inquiry (2017) are to:

- Inquire into the delivery of the Edinburgh Trams project ('the project'), from proposals for the project emerging to its completion, including the procurement and contract preparation, its governance, project management and delivery structures, and oversight of the relevant contracts, in order to establish why the project incurred delays, cost considerably more than originally budgeted for and delivered significantly less than was projected through reductions in scope.
- Examine the consequences of the failure to deliver the project in the time, within the budget and to the extent projected.
- Review the circumstances surrounding the project as necessary, in order to report to the Scottish Ministers making recommendations as to how major tram and light rail infrastructure projects of a similar nature might avoid such failures in future.

The underpinning rationale for the inquiry is to understand why public funds were wasted and to understand how to avoid such a situation in the future (Lord Hardie et al., 2017). Is it reasonable to assume that similar arguments should apply to all public projects? The extent of the investigation (public inquiry through to an after-action review) should be proportional to the extent of the overrun or impact of the capability not being available as planned, but we have not been able to identify a formal requirement for public bodies to conduct such a review.

A similar argument could also be applied to private sector companies who are investing shareholder's money. Is it a reasonable expectation from shareholders that the challenges experienced in the course of project delivery are shared with those who follow so that they can be mitigated or avoided? If the organisation is unable to leverage the experience from project delivery, does it also raise doubts about the ability of the organisation to leverage the experience from its contractual commitments? Recent corporate failures, such as the UK's Carillion, illustrate the consequences of not leveraging experience can be catastrophic, not just for shareholders, but also for thousands of employees, public services, suppliers and pensioners.

Instinctively we know that there is value in leveraging experience. There appears to be a consensus that having a capability that leverages experience has merit (Cavaleri et al., 2012; Flood, 2002). The challenge resides in developing a capability that demonstrably adds value and this value exceeds the potential value of competing investments. NASA's work extracting text from lessons learned documents and applying topic modelling to identify themes (Meza, 2015), combined with Matthies (2017) work on a text mining approach for extracting lessons learned, provides a useful foundation from which to build. NASA also integrated this analysis into a graph database to help to understand relevance and prioritisation. Although this helps to relieve the burden associated with retrieval and relevance of lessons, it loses the context and insights that are associated with a lesson. We argue, that by expanding the graph database to include the lesson's impact on project variance; forensic insights such as trigger events and root causes; the effectiveness of action taken to manage risks and issues; and a range of other key variables, there is an opportunity for project practitioners to delve beneath the headlines to explore the extent to which the experience may be applicable to their project.

The research proposition provides the opportunity to *amend the P3M theory, frameworks, and methods behind the practice* for a possible future, recognising the need to integrate three models (knowledge model, incentive model, and data model) into the *Leveraging Experience (LevEx) Framework*.

11. Conceptual Framework

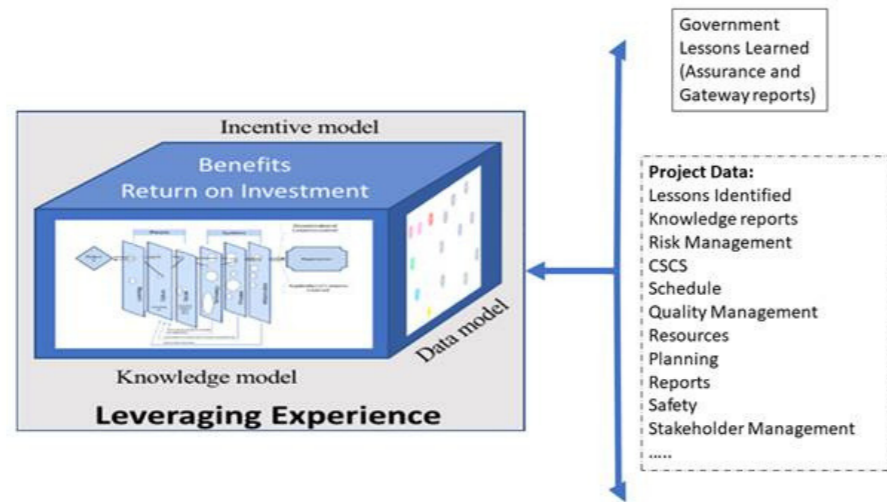
Our research findings found the need to move away from an approach centred around 'lessons learned', towards 'leveraging experience'. Lessons learned processes tend to result in lists of observations, yet in reality what organisations require is an insight into how previous experience can influence future project delivery. A specific experience tailored to the point of need. For example, this experience may be how a schedule was structured to deliver a specific output and the risks which emerged during its delivery; experience acquired during construction and captured within technical papers; the degree of success of management action on a specific risk; insights into dealing with a specific and challenging stakeholder, captured within a stakeholder management plan. As soon as this experience is captured within a template, it loses the interconnected insights that aid the practitioner in deciding how that experience can be applied. A graph database can help to retain these connections while providing a capability to query the data, filtering experience to ensure that the insights remain relevant for the user. The notion of project managers having to acquire infinite knowledge is a flawed one. Hence, we would argue that within the context of lessons learned in project management, the primary challenge is relevancy and prioritisation of action based upon insights derived from the projects circumstance and metrics. We will propose that the answer lies in the interconnections in the data and our ability to interpret them, rather than applying a recipe book of lessons identified.

11.1 Leveraging experience framework

To begin to understand the effects of an organisation's lessons learned, we propose a Leveraging Experience (**LevEx**) framework represented in **Figure 4**.

This LevEx framework is a conceptual model of how an alternative approach could be implemented for lessons learned. The LevEx conceptual model is based upon three primary categories of work:

Figure 4. Leveraging Experience Conceptual Framework



11.1.1 The Knowledge model.

The knowledge model builds on the Syllk model to ensure that the organisation has the knowledge know-how, capability, capacity, structure and frameworks to enable it to leverage its experience. Prusak (2015, p. 4) states that: “knowledge management is still in its infancy. It has had some notable success as well as much failure, and still has a long way to go in developing standardized and proven models and methods.” Successful projects “put less effort into directly codifying tacit knowledge and put more effort into linking people with knowledge to one another, to forming and supporting communities and, in general, providing an environment in which knowledge might be shared, enhanced and, sometimes, created”(Grant & Qureshi, 2006, p. 4). Duffield (2017) completed a comparative analysis of the Syllk model showing that the Syllk model met Ale et al. (2014) KM implementation requirements. The Syllk model has been integrated with a new tool-set for managing projects. This tool-set is a response to calls for project managers to be able to apply new project managing thinking “in practice.” The tool-set integrates the project-space model and the Syllk model (van der Hoorn et al., 2016). Together, they bring visibility to enablers and constraints to project delivery capability, and these learnings can then be integrated into the organisation's systems to build (in a tailored) manner ongoing project management capability. Specifically, the tool-set highlights the hindrances to project delivery and what capabilities need to be “wired” into an organisation to overcome them. This tool-set integrates the learnings from concrete “lived experiences” of project managing into future organisational initiatives.

The Norwegian Public Roads Administration has adopted the Syllk model as an organisational lesson learned model (Ekambaram, Stene, Hamre, et al., 2016; Ekambaram, Stene, Dahl, et al., 2016; Stene et al., 2016). Rolstadås and Schiefloe (2017) refer to the Syllk model as an organisational model that fulfils the organisational requirements described by Burke (2011, p. 191); where a model helps to sort information, enhances understanding, interprets data, provide a common language and helps to guide action for change. More recently the Syllk model has been used to support digital change lessons learned programme in three German-speaking countries (Austria, Switzerland and Germany).

11.1.2 The Incentive model

A capability to leverage experience must compete for investment with parallel priorities. The benefits of such a capability must be defined, measurable and regularly reviewed at Senior Executive and Board level. The organisation must be able to measure the return on investment otherwise the incentives to maintain a capability to leverage experience will wane.

11.1.3 The Data model

Lessons learned do not sit in isolation, and by extracting them and associated project data, we often lose insights into impact, context, management action taken and a wide range of other parameters. It is essential that experience is captured within a data model. Data science will impact project delivery at every level. From the automation of routine tasks through to the application of the knowledge and experience of past project delivery to future projects.

Conceptually, if we aggregate the knowledge of delivered projects, we should be able to apply this knowledge to improve how projects are delivered in the future. Machine learning works by digesting large volumes of data and identifying patterns (content analysis) within that data. These patterns will enable us to get a better understanding of what conditions a project, team or organisation are predisposed to. We can then implement measures to sense when these conditions are likely to arise. Machine learning can then provide evidence driven probabilistic recommendations on preferred courses of action, tailored to the specific circumstances of the project and leveraging the body of data from all projects that have gone before.

12. Limitations and challenges

The critical challenge in this research has been gaining access to data. In the case of at least nine departments, the lessons learned are scattered across the organisation and are difficult to retrieve, which indicates that those who wish to use them will struggle to locate them. The research has focused on the public sector because the FOI process facilitates access to the source data. However, we have also worked with four private sector organisations, and their experience is similar to that of the public sector. There is anecdotal evidence from organisations such as Events Scotland that as project cycle time reduces and the similarity between projects increases, the higher the opportunity to leverage experience, i.e. the ability to apply lessons from one project to another becomes more apparent. We have been unable to identify sufficient public bodies to substantiate this. Although this paper has focused mainly on those recorded lessons, we acknowledge that knowledge management practitioners blend reflective learning, peer assists, communities of practice and a variety of other methods to facilitate organisational learning. We appreciate the value that these approaches can provide, as they have been used with the Syllk model (Duffield, 2016; Duffield & Whitty, 2016a, 2016b; Duffield, 2017). However, we have not explicitly researched the impact that they have on project delivery performance with the departments and organisations involved in this study. The data model challenge is to understand what we (P3M) would like to achieve and deliver a roadmap for achieving it. There will be a number of challenges along this journey associated with data availability and confidentiality, but these are surmountable if we work collegiately with the ultimate aim of transforming how projects are delivered. There is a potential problem during the case analysis data reduction phase that the researcher’s own biases may influence the process. This influence was minimized through interactions with another researcher (co-author) and having ethical discussions as we made progress with the study.

13. Future research

Future research will further explore the application of a data-centric approach to forge the connections between the driving event, lessons, risks, impact and other lessons. We propose that such an approach will enable organisations to capture the intellectual rigour that underpins the analysis, while also providing the evidence to substantiate the return on investment to understand the extent to which lessons are genuinely being learned. Four tracks for future research based on this paper are further development of a conceptual framework, empirical studies, meta-analyses and empirical validation. The next paper we plan to revise the LevEx conceptual framework evolving from lessons learned to leverage the rich seam of experience that is encoded within project delivery. Future papers will also consider the impact of volume of lessons on the ability of an organisation to extract relevant insights and we will also explore the integration of the Syllk model within the LevEx conceptual framework. Project Management Body of Knowledge (various books, guides and standards) are all focused on what and how to do it. There is no focus on the why to do a process. The approach to KM and lessons learned are often very different between the various books, guides and standards. Future research is planned to provide a transformational change to the Project Management body of knowledge incorporating the LevEx framework and Syllk model, recognising the knowledge needed to deliver projects successfully.

14. Conclusion

This study supports the evidence that P3M lessons learned practice continues to defy expectations, and there is a need to refine or amend the theory, frameworks and methods behind the practice. The study also established lessons identified are superficial, and there is insufficient evidence that lessons are being learned. A significant amount of literature is published on lessons learned, and refinement of the methods to date has failed to deliver the step change that is required. A decision now exists for the P3M community on whether to accept this direction of travel or assess whether a change in approach can deliver a measurable benefit that enables investment in a Leveraging Experience framework. The findings contribute to the project and knowledge management literature and provide an opportunity to significantly improve project knowledge sharing. There is an ‘elephant’ in the room; it is time we talked about it.

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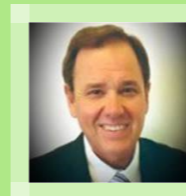
Martin is a Registered Project Professional with the APM and a Chartered Engineer with the IMechE. He is the CEO/Founder of a P3M and data science consultancy called Projecting Success who helps project organisations to connect and understand their data for a more certain, evidence-driven project delivery by analysing historical and real-time data to discover insights and make recommendations with improved confidence in outcomes. He has 30 years of delivery experience spanning senior strategic roles across government and the private sector, led projects of up to \$1bn, both client and supply side and he also led a PMO for a \$multi-billion portfolio of ICT projects.

In late 2017 Martin established the London Project Data Analytics Meetup, the UK's largest community that combines the cutting edges of data science and project management ranging from hosting talks, delivering hackathons through to influencing future thinking on project data science. He has also been instrumental in establishing a project data analytics work stream within the APM, helping to shine a light on the art of the possible and facilitate the development of a new cadre of professionals.

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