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A challenging success: a process audit perspective on change

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Abstract

Purpose – The purpose of this paper is to explore how success emerges in a business process change initiative, given the often conflicting forces and challenges present in a workflow implementation. A detailed reflective analysis provides an opportunity to explore how different process enablers interact to achieve non-obvious outcomes.

Design/methodology/approach – Data collection entailed semi-structured interviews, observation of project activities, and analysis of project documentation for a workflow project at a public sector organisation (AustGov). Data collection occurred from project initiation to implementation and is analysed utilizing the process enterprise maturity model.

Findings – Despite encountering numerous issues, the process workflow went live as planned; the project was a success. The case demonstrates how project drivers interact in context to provide a coherent explanation of project outcomes. That the project did not fail, despite encountering obstacles and challenges, is attributed to the maturity of critical process enablers within the portfolio.

Research limitations/implications – The AustGov case study provides an exemplar of how and why interrelationships between process enablers and project context matter. The case analysis provides a rich study of a workflow project, and demonstrates the suitability of the process audit framework to explain outcomes of business process change projects.

Practical implications – The findings demonstrate the importance of managing interdependencies and competing priorities between process enablers to successfully implement business process change.

Originality/value – The case provides a rich example of the implementation of business process change using workflow software. The authors find that achieving successful outcomes in a challenging environment is best understood when viewed from the perspective of the maturity of a portfolio of project enablers; also, that attention needs to be paid to developing advanced maturity in those enablers most closely related to the specific challenges evident in the project context.

Keywords Business process re-engineering, Process management, Change management, Workflow, Process audit, Process enablers

Paper type Case study

1. Introduction

Implementing business process change is a complex undertaking which often results in less than desired outcomes (cost overruns, delays, user acceptance challenges) (Kettinger *et al.*, 1997; Palmberg, 2010; Subramoniam *et al.*, 2009). Understanding success and failure in information technology enabled process change is an enduring imperative. As Hammer (2007, p. 112) notes "Contrary to widespread assumptions, designing new business processes involves more than rearranging work flows". Workflow systems provide a means to automate and manage processes in an organisation. Workflow systems create and manage the execution of workflows through the use of software, running on one or more workflow engines, which are able to interpret the process definition and interact with workflow participants (Allen, 2001). Despite their growing importance over the last decade, detailed descriptions of the implementation of processes

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using workflow systems are at best scarce in both the research and practitioner literature, and what studies do exist tend to focus on the technological aspects rather than the process implementation *per se* (Macris *et al.*, 2008; van der Aalst and Lassen, 2008). By contrast in this study we examine over time, from a process audit perspective, the implementation of a workflow system. In so doing we seek to encourage a more holistic understanding of process change and the enablers of success. Specifically, we address the question: How does success emerge in a business process change initiative, given the often conflicting forces and challenges present in a workflow implementation?

In this study we examine a case of a somewhat surprisingly successful process change through a process audit using the lens of Hammer's (2007) Process and Enterprise Maturity Model (PEMM). Specifically, we provide an in depth descriptive analysis of the implementation of a business process change using workflow software at a sizeable Australian public sector organisation (AustGov). Our aim here is to illustrate in a novel way the analytical value of PEMM, at the level of the individual process. Further we seek to explain a successful implementation of a process change, despite a context of challenges (organisational and technological) that, in isolation, are more suggestive of implementation failure than success.

The structure of the paper is as follows. We begin by describing the organisational context of AustGov and some of the challenges it faced. We then describe our research method and approach to applying PEMM. In Section 4 we describe the process change project at AustGov in terms of the five process enablers of PEMM. We then, in Section 5, analyse the evolution of process maturity in the AustGov project, from initiation to implementation to explain the observed success despite some very real challenges that could have led to a failed implementation. We conclude by discussing the broader implications of the case study, and in particular the analytical value of our PEMM based process audit.

2. Organisational context

AustGov is an Australian Government organisation, established as a semi-autonomous incorporated body with nearly 1,500 employees. AustGov prides itself on innovative use of IT and makes wide use of IT for everything from staff intranets through to financial operations. However, AustGov faced a dire situation; its financial systems lacked adequate functionality but the financial climate was not supportive of any large-scale IT investment. The central government was reducing funding, and the need to support core operational activities was seen as more important than the desired enterprise resource planning (ERP) system upgrade. In addition, AustGov was engaged in organisation wide wage and salary negotiations at the time when the upgrade was being put forward. The decision to invest in a large-scale IT project in such a climate was unpopular in areas outside of financial operations. These forces created an environment where it was important to demonstrate some definitive returns from the AUD$1.5 million that the upgrade would cost.

AustGov management adopted a novel approach to confronting this challenge. Rather than try and cut-back or delay the required upgrade, AustGov expanded the upgrade project to incorporate the introduction of a workflow system. Senior management were of the view that redesigned business processes, together with an appropriate workflow system, held the key to demonstrating positive and early returns on the sizeable

IT investment. Thus, AustGov embarked on an implementation of a workflow system to generate the returns to justify the required ERP upgrade.

The ERP upgrade and workflow project at AustGov involved a platform change from AS/400 to Unix/Oracle – moving to full client server architecture and supporting both PCs and macintoshes. The project team consisted of a business analyst who had some knowledge of business processes and basic technical skills, an administrative manager, who was given the task of identifying relevant processes and possible improvement areas, and a consultant (a former AustGov employee), who was hired to support the business analyst and oversee the project progress.

In contrast to most process change projects, which originate once a problematic process has been identified as requiring redesign, the AustGov case required the project team to identify a suitable process to trial and showcase the embedded workflow functionality in the selected ERP software. Senior management had expressed a desire to locate a process that had large transaction flows but was currently inefficient and not well controlled. After some initial discussion within the project team, a proposal was made to examine a sub-process within accounts payable. The process chosen was payment for goods that had been procured without first issuing a purchase order. This process was commonly known as cheque requisition, and accounted for approximately 23,000 transactions per annum. According to a project team member:

> Cheque requisition is a slow and time consuming process which involved the movement of significant amount of papers through the internal mail. We proposed to create a workflow based tool for on-line cheque requisitions which aims to route requisitions to the appropriate approving officer via electronic mail.

3. Research method and the PEMM

3.1 Case study method from data to theory

The use of a case study method enabled us to focus on "how" and "why" questions (Yin, 1994) to understand the lifecycle of AustGov's business process change from conception to implementation. We adopted a "multiple information sources" approach (Orlikowski, 1994) involving observation, open discourse with organisational participants, and the review of written materials such as design documents and internal communications. This approach permitted us to gather in-depth information (Cavana *et al.*, 2001) about the evolution of the process change at AustGov and the challenges faced over the duration of the project (Bryman, 2004). In particular, this approach allowed us to both directly observe conflict and tension between user and designer perspectives on requirements as well as via comparative analysis of design documents. Furthermore, it enabled us to be informed, through observation and discourse, of issues of a sensitive nature in terms of workforce management and commercial interests. Notably the level of access provided to AustGov documents, management and design discussions was unprecedented in our prior research experience.

From theory and method perspective we purposely chose to be led by observation rather than impose a theoretical framework from the outset (Cavana *et al.*, 2001). In part this was somewhat of a philosophical experiment on our part in that it was driven by a desire to ensure we would not lose the richness in the context by too quickly imposing a restrictive theoretical lens. Rather as our understanding of the unfolding AustGov case developed overtime we sought out an appropriate lens that could provide perspective on the challenges, conflict and surprising success observed in AustGov.

Consequently, we adopted Hammer's PEMM as such a lens, although it is important to note that the inception and design of the AustGov project pre-dates the publication PEMM in 2007, and so we can be certain that PEMM in no way directly informed or influenced what we observed at AustGov.

3.2 The selection of PEMM as a "lens"

In selecting a "lens" by which to view the business process change at AustGov, we sought a perspective that made sense of the challenging success we had observed. Consistent with our research question, we sought to provide a rich understanding of the AustGov case. To this end we selected Hammer's PEMM. As matter of brevity and scope we have not endeavoured to contrast PEMM with its alternatives. Conceptually, such comparisons already exist in the literature (Rohloff, 2009), and practically such a comparison is beyond the bounds of our research question. As the ensuing analysis reveals, PEMM provides the insight we sought into the perplexing events and issues of the AustGov case.

In introducing PEMM, Hammer (2007, p. 112) notes as motivation a lament on conduct of process change in organisations:

> [. . .] executives, especially when they work in different functions, often disagree about the factors that aid process-based transformations [. . .] one focuses on technology, another on human resource issues, a third on organizational structure, *creating confusion and conflict* (emphasis added).

Some confusion and conflict was certainly what we had observed at AustGov which suggested PEMM may be a useful framework for understanding the situation. That PEMM provided formal guidelines for assessing maturity with respect to the ability to manage process transformation was also attractive. This meant that PEMM offered the potential to explain the success that we observed emerging from the confusion and conflict (by enabling a more objective assessment of the severity of the factors underlying the observed confusion and conflict). Furthermore, we found relatively little prior research substantively using PEMM, in part because of its recency (for exceptions see for example Palmberg, 2010; Rohloff, 2009). Finally, we recognised that we had a somewhat unique opportunity in exploring the analytical value of PEMM in a case that pre-dated PEMM's publication.

Structurally, PEMM has two major components: a set of five process enablers, and a set of four enterprise capabilities. The maturity level with respect to the process enablers is specific to a given process. The maturity level with respect to enterprise capabilities, not surprisingly, applies to the entire organisation. As our case analysis is primarily concerned with a single process, we focus in this study only on the process enablers.

3.3 The PEMM process enablers

PEMM contains five process enablers: design, performers, owner, infrastructure, and metrics. For each of these process enablers, Hammer (2007) describes in detail four levels of maturity (P-1 through P-4, from least mature to most mature). While our analysis and discussion of the AustGov process change is conducted at this lower level of detail (Sections 4 and 5), for reasons of brevity we provide below only the high-level description of the nature and maturity of the different process enablers. Hammer (2007) details the distinctions between the four maturity levels for each of the enablers on which we base our analysis and discussion.

Design is concerned with the comprehensiveness of the process specification. A process specification details who does what, in what order, together with when (i.e. under what conditions), the information required and the precision to which the task must be completed. A mature process is one that not only has been re-designed from end-to-end but fits with customer and supplier processes, has clearly established performance expectations, and is so well documented that analysis and process re-configuration can be explored electronically by management.

Performers refers to the knowledge, skills and behaviours of the parties involved in the execution of a process. For example, it captures their knowledge of the process, information flows, and other parties to the process and performance metrics. At the most mature end of the spectrum performers are not simply skilled in problem solving with the process, they are effective at business decision making and change management. They are on the lookout for process change triggers and are able to suggest appropriate improvements.

Owners refers to having clearly identified ownership of processes, and the degree of authority to plan and execute process change. High maturity in this dimension is reflected in a process owner that is part of the senior executive, and who is engaged in strategic enterprise-level process improvement and redesign, with authority over process budget and strong influence over the staff who execute the process.

Infrastructure reflects the maturity of both information systems and human resource systems. Maturity here requires modular, industry standard information technology architectures and staff development, recruitment and incentive arrangements that promote recognition of the intra and inter-organisational impacts of the process.

Metrics refers to how well the process is measured. This reflects both the comprehensiveness of what is measured and the regularity of review of process metrics relative to targets, and the resulting strategic impacts.

In broad terms, immature processes are narrowly designed (e.g. from a single function perspective) and carried out by unempowered, functionally focused staff, with no formal process owner, built on fragmented systems, with limited metrics. Mature processes reflect not just the organisational context and issues but adopt an inter-organisational perspective as well, with ownership by senior strategic leadership driving process improvement and redesign informed by industry trends and a comprehensive portfolio of performance metrics.

Importantly, the five process enablers are mutually interdependent. Hammer (2007) claims that maturity in any enabler alone is insufficient for success, what matters is the maturity of the portfolio of enablers. In practice this is complicated by the fact that different enablers may be at different levels of maturity within the one organisation. In our analysis that follows we explore this variability in maturity and in essence provide a rich case illustrating Hammer's claim that the enablers are mutually interdependent. Furthermore, we highlight how the maturity of different enablers evolves over the course of the project, to generate a portfolio of sufficient maturity for success despite significant challenges.

4. Exploring the challenges in process change: a PEMM perspective

4.1 The foundations of a PEMM perspective

To begin our application of PEMM we describe in depth the process change project at AustGov in terms of the five process enablers. Our purpose in this section

is purely descriptive. We do not attempt to assess maturity levels or provide any holistic reflection. Rather, we simply organise the events, activities, challenges, and decisions made in the AustGov project around the five process enablers. By structuring the AustGov "story" in this way we lay the foundation for our analysis of the evolution of the process presented in Section 5.

4.2 Design

Design is concerned with comprehensively specifying the process; for the AustGov team capturing and modelling their selected process was a problem. There were a number of ways in which the cheque requisition process could be enacted, depending upon the urgency of the request and the organisational participants involved. Attempts to model these diversifying activity paths were not entirely successful. In addition to these content-related modelling issues, other concerns arose around the selection of a modelling technique, and the amount of information to present in various models. The workflow team had no previous experience with any formal modelling methods. As a result, they decided to adopt a trigger model (Joosten, 1994; Kuechler *et al.*, 1998) recommended by the consultant. The model was viewed as the most complete for workflow modelling and was purportedly very user-friendly. The users were keen to utilise and extend the modelling technique to suit their project team and goals.

After several project meetings, the team members created an extended model of the existing process (Figure 1) which included details about activity costing and timing. However, it became apparent that a single model would not suit all project stakeholders. There was some initial dissention as to whether the model was being created for the purpose of informing the users, or identifying the technical requirements. The suitability of the proposed model impacted upon the ability of decision makers to select appropriate process activities and sequencing, and also on technical staff in their deliberations relating to building and implementing the process. Before a decision could be made, it was necessary to demonstrate the models of various processes to the stakeholders. The project team finalised a modified version of the trigger model for use within the project team and team management. However, the model was deemed unsuitable for both end-user discussions, and technical development of the proposed process. The dilemma was whether to adopt a multitude of single purpose models or simply a complex multi-dimensional model. After much debate, the project team elected to utilise separate models for each of the stakeholder groups involved when modelling the revised processes.

Even within a particular perspective process models were challenging to develop. Finding an agreed start and end for processes also caused some difficulty for the project team. At one stage, the process was modelled commencing when a goods request was placed with a supplier; this was subsequently modified to commence the process when an invoice was received from a supplier. Similarly, the end point was initially defined as occurring when a transaction was added to a batch to generate a check for payment, but was later modified to end after a cheque was generated for the supplier. Differing design preferences were also evident between the IT professionals and the finance officers. For example, the finance officers preferred a more flexible process model, with a range of paths available to suit different working styles, whereas the IT professionals preferred to minimise the degree of complexity depicted in the model. The two viewpoints did not converge, but rather both, a user model (Figure 2(a))

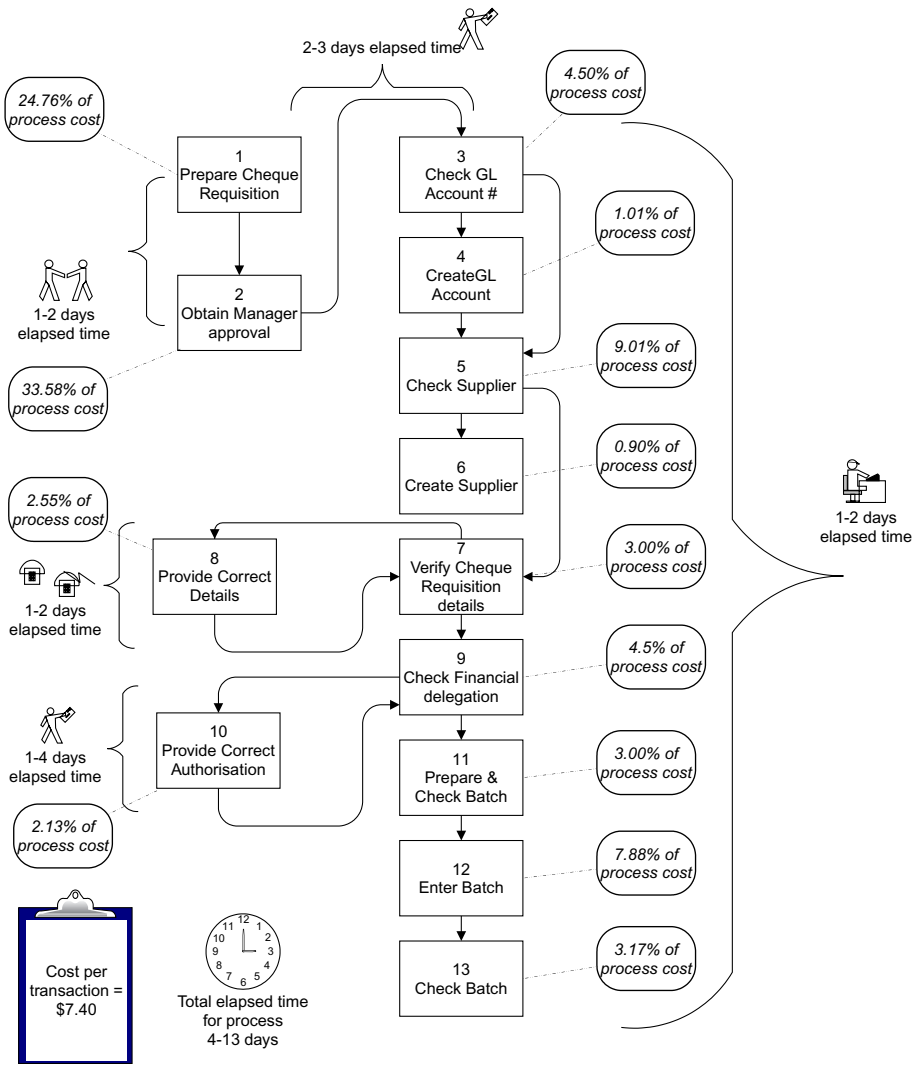
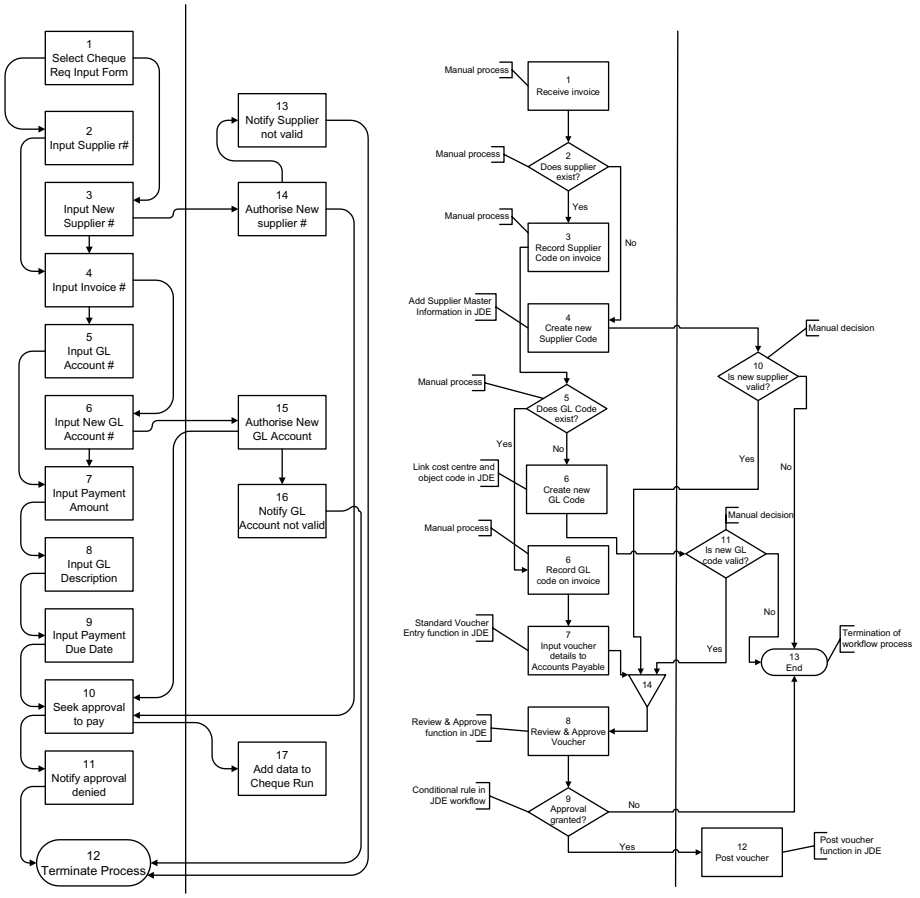


Figure 1.
Existing cheque requisition process

and a technical model (Figure 2(b)) of the revised process were retained throughout the development and implementation of the new workflow.

While at a surface level the two models are not fundamentally in opposition, they do reflect quite different perspectives on the process. Even a cursory glance of the user model shows a focus on describing the process in terms of the physical activities the user must carry out or initiate in executing the process. By contrast the technical model focuses more on the tasks and decisions made (primarily by the system, but also by users) and the connections to the underlying ERP. By not resolving these models into a single unified model an ongoing dialogue was maintained and the models were better able to reflect the requirements of different stakeholders. The challenge created by this



Notes: (a) User version; (b) technical version

Figure 2.
Excerpts of the revised process: user and technical versions

ongoing duality was that the development and design team needed to manually manage the consistency between these two models.

4.3 Performers

Performers refers to the knowledge, skills and behaviours of the parties involved in the execution of a process. In common with many process change projects, individual performers were somewhat challenged by the design changes. One of the primary changes introduced was to transfer tasks related to recording and validating payment data from the finance office staff to individual departments. From the finance officers' perspective, they could provide better customer service if they only had to focus on managing the payment process, rather than the initial recording and validation of data, however, according to one of the finance officers: "It was felt that if these consequences were known at an earlier stage, then the workflow trial would be compromised, and possibly unable to proceed."

Given the difficulties in defining even the start and end of a process, end-user involvement would seem to be essential. However, there was an internal political cost with this involvement. At the time of implementation, AustGov was in the midst of a round of enterprise bargaining (i.e. union salary negotiations). Senior management was concerned that some employees might assume the workflow trial would automatically lead to job cuts. As a result, end-users were kept from the project planning and the initial documentation of the selected process. Communication with end-users throughout the entire project was extremely limited; most AustGov staff were unaware of the proposed trial. This represented the loss of a valuable source of information for the project team. User involvement may be valuable from a task performance perspective, however from a political perspective it can be problematic. The implication of this for project participants was they needed to determine how to redevelop the process in a user centred manner when they were unable to directly interact with the user community. Communication between the project team and the AustGov IT operations department was also less than open. The prioritised need to support existing production applications also led to some tension between the team and IT staff; more open communication might have resolved these issues. There was a lack of formal change management techniques during the pilot stage of the project which caused some tensions. For example, according to one of the users: "The project team did not address any organisational issues we had encountered to date."

As an example of the difficulties encountered, initially column headings were used on process models to indicate departmental responsibility for individual activities within the selected process (i.e. labelled swim lanes were used). However, a request was made to remove these headings from the columns, as they clearly indicated the intention to devolve the currently centralised workload out to end-user departments. It was felt that such a display of intent might not be palatable to end-users during the design phase of the project. A related issue was that the redesigned process might not be compatible with the culture of the end-user community. The selected technology included a pre-defined decision rights and timings hierarchy, and several of the project team expressed concerns about this formalisation of the current process, which was largely informal, and varied between departments. In addition, it was felt that clerical workers might see this as a threat to their work styles, with failure to promptly attend to messages resulting in notification to their managers, creating an impression of poor job performance. This concern serves to illustrate the role of systems as agents of social change, with the chosen software's functionality impacting fundamental process design choices in addition to eventual implementation outcomes.

The devolution of tasks envisaged in the redesigned process would result in job redesign for two groups of people – finance office staff and individual departmental staff. In the case of finance office staff the change would result in job enrichment, freeing them from the task of data input and validation, and allowing them to spend more time in an analytical or management role. The opposite situation was proposed for departmental staff. They would become responsible for keying in data that they had previously only needed to write down and forward to the finance office for input. It was acknowledged within the project team that this change at departmental level would be difficult to "sell" politically, and that care should be taken to be sure that discussions were held at a suitably senior level prior to releasing this information more broadly.

Some project team members also expressed reservations about the willingness of end-users to replace the current face-to-face interactions with a technology-based solution. These concerns related to the replacement of task handovers that currently occurred in person with pre-scripted e-mail messages. The workflow toolset allowed an *ad hoc* note to be attached to the scripted e-mail for additional information to be provided, which was mostly thought to be sufficiently flexible. The finance department representative argued that some of the information currently conveyed during task handover discussions would be lost; indicating their perception of the importance of retaining and supporting informal communication methods.

4.4 Owner

Owners refers to both ownership of process, and having the authority to plan and execute process change. Senior management at AustGov was supportive of the project team. For example, the director of personnel and financial services frequently assessed the project progress and ensured the availability of appropriate resources. In addition, the project steering committee regularly received and commented upon progress reports, and provided a forum for idea discussion and problem resolutions. In the early project stages, end-user involvement was limited as senior management was opposed to involving the end-users. It might appear that the level of change proposed was not radical, the trial process was a small part of many employees' daily work, and the changes undertaken would not impact upon their working style to a large extent. However, what was more far-reaching was the possibility that a successful trial would trigger a large-scale expansion in the use of workflow processes, resulting in radical changes in the workplace. The workflow trial process as such might be seen as a precursor to radical change. Owing to this lack of end-user involvement, it was impossible to fully determine if process change would be a problem. It was clear however that information produced from instances of processes would form a pattern that would enable management to assess the workload and work skills of individuals who performed activities within the process.

The potential for changes in power and authority was quite substantial. For example, the project members faced some difficulty because of the need for workflows to have a pre-defined hierarchy for payment approval. Traditionally within AustGov, the head of department or the division manager would authorise payment approval. However, many of the incumbents had delegated this authority to other able colleagues. As a result, the proposed process workflow, which was going to follow the formal rules of AustGov, would eliminate such flexibility and be likely to upset some of these users; established informal delegations of power would be impacted by the workflows. Within AustGov, some people with funding delegations were seen as more likely to approve spending within a department than others, and hence they were more frequently sought to provide payment approvals. The introduction of workflow would reduce the power of individuals to select the approver who they perceived more likely to prove sympathetic to their requests. The question of whether to align the workflows to suit the existing business process and organisational structures was discussed, but it appeared that the opportunity to redefine some parts of the business process using the workflow technology as the justification was seen as opportune.

While it has long been recognised in the literature that information systems can impact power relations and politics in organisations (Markus, 1983), this seems

particularly the case with workflow systems because they directly point to decision authority as well as information flows. According to one of the project team members: "Workflow, whilst encompasses many great principles to senior management, is most likely seen as something sinister by the general staff and the line managers."

In the AustGov case this power and politics dimension resulted in senior management strategically excluding end-users from involvement in the project. However, the political action ran the risk of becoming a self-fulfilling prophecy by playing into perceptions that "something sinister" was at hand. More broadly it also reduces the likelihood of success of the project, given the recognised importance of user involvement systems development and implementation success (Barki and Hartwick, 1989; Baroudi *et al.*, 1986; Hartwick and Barki, 1994; Kujala, 2003; McKeen and Guimaraes, 1997).

The ownership enabler (Hammer, 2007) improved to a level where there was a visible owner role adopted by an individual with sufficient power and credibility to articulate process goals, support the design and implementation of process changes required, and ensure ongoing compliance with design requirements. AustGov had a powerful and credible process owner in the director of personnel and financial services, who was also responsible for initially convening the project team, and for allocating and controlling the project budget.

4.5 Infrastructure

Infrastructure reflects the maturity of both information systems and human resources. At AustGov, the ERP software being installed was a version that was becoming obsolete by the time the project went live. The workflow tools were considerably less developed and more cumbersome than the later version of the software (Figure 3); as a result

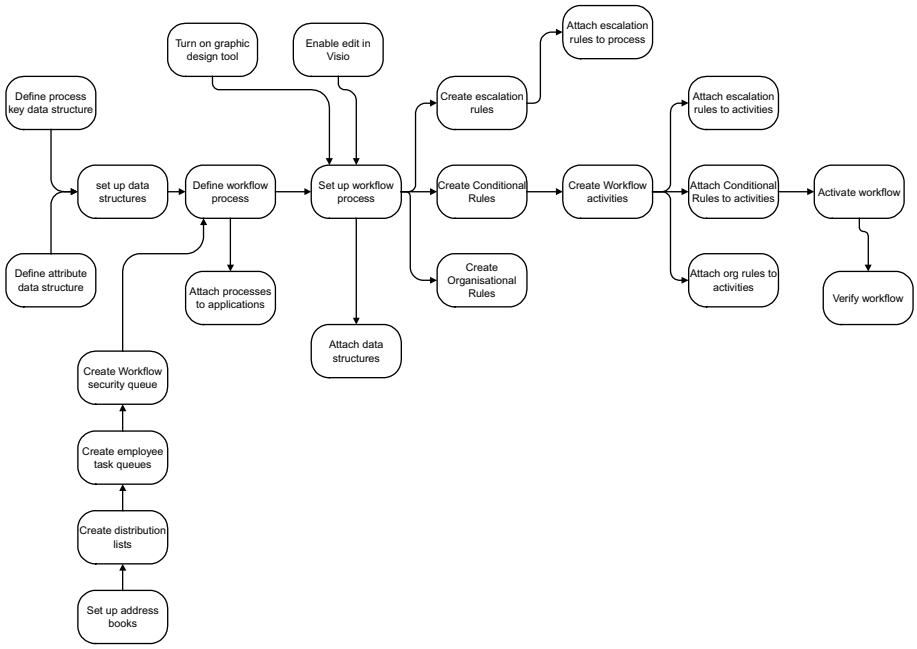


Figure 3.
Steps to set up and configure workflow

the software vendor preferred that AustGov adopt the newer version prior to rolling out any workflow processes. The vendor provided all training and documentation in the later version (which was not currently available at the AustGov site) and was clearly reluctant to support the development or use of workflow tools in the earlier version. This caused tension between the project team members and the technical support staff, as technical staff exhibited considerable resistance to the option of upgrading an ERP suite (that had not been fully implemented in the production environment) based on the needs of a small sub-set of the user group.

AustGov ran a mixed platform environment however the workflow tools tested were fully compatible only in a PC/Windows environment. The major implication of this was that Mac users were unable to send or receive attachments to file messages, and were also unable to access the ERP software directly via a workflow message shortcut. The ERP included an internal e-mail client, which was accessible at desktop level only after entering the application suite. In order to optimise the use of workflow, it was desirable to have the workflow-generated messages automatically transferred to the existing desktop e-mail client. Originally, AustGov was advised that the ERP product could integrate with any MAPI compliant messaging system; however, the vendor preferred and supported only Microsoft Outlook and Lotus Notes. AustGov was utilising a different e-mail platform and had no plan to alter this. During initial familiarisation with the workflow software, it became clear that the ERP suite was incapable of communicating acceptably with the e-mail client in use at AustGov. This left the project team with a choice of either attempting to gain support for a change of e-mail client within AustGov, or implementing a workflow system which was incapable of messaging directly to the most commonly used e-mail desktop client. The interim decision was against using third-party messaging, thereby limiting the effectiveness of the workflows; users had to actively log onto the application suite to interact with the workflow, indicative of the challenges arising when project teams are required to interact with and support legacy systems outside the scope and control of the project.

A critical component of workflow software is the ability to generate a message to an appropriate role, or individual, usually for approval of a proposed action or confirmation of a request. In order to achieve this, a list of appropriate addresses and their related financial delegations must be maintained. This particular software utilised a central address book, which was accessed by all applications using the ERP modules. As the ERP software was not inclusive of the AustGov human resources or payroll systems, it seemed likely that information required for workflow addressing would need to be manually entered and maintained. The proposed solution was to appoint a coordinator to gather and maintain address information, with a view towards possibly creating an automated version in future.

During the implementation process, technical resources were difficult to secure – the product vendor had to source workflow support from a diverse range of locations, as a result there was not a lot of continuity when vendor representatives worked on-site with the workflow team. The steep learning curve to implement the workflow process was due in part to the architecture of the ERP suite, which relied upon a complex three-tier client server architecture with a layer of deployment servers in addition to the standard application and data servers. Technical support for this environment was always difficult to engage.

One of the features of workflow software is the ability to escalate an instance of a process where an activity has been inactive for a pre-defined period of time. As an example, if a message requesting approval for a transaction was not answered within a specified time, the message would be escalated to the next level of the address hierarchy for approval. To utilise escalation required a hierarchical addressing list to be created and maintained, along with a definition of appropriate timing for the escalation to occur. It was found that the ability to set escalation timeframes was definable only in terms of hours, e.g. 48 hours. The system could not set global lists of weekends, and other non-working days. As a result, the escalation functionality was virtually unusable in the supplied toolset. Without escalation, it would be difficult to ensure that all initiated instances of processes were completed within a reasonable timeframe, as process cycle times would need to be manually controlled.

4.6 Metrics

Metrics refers to how well the process is measured. For the AustGov team there was little information available concerning the performance of existing processes. As a result, the project team spent a considerable amount of time and effort developing a set of metrics, which would be used to measure existing and future process performances (see Table I for example metrics).

The metrics in Table I are expected costs for the redesigned process, and were produced by the project team as part of the business case presented for the workflow trial. Given the estimated volumes of 23,000 transactions per annum for the cheque requisition process, the expected cost per transaction was $3.53, a sizeable decrease on the estimated current cost per transaction of $7.40 (Figure 1). The existence of process metrics improves the strength of the metrics enabler (Hammer, 2007).

5. Analysis and discussion: the evolution of process maturity

5.1 Maturity analysis

The primary driver for the project arose from a desire to maximise benefits from a financial systems upgrade; process automation via workflow was seen as a way for AustGov to establish some tangible benefits. Despite the many issues encountered as the project proceeded to completion, the cheque requisition process workflow went live as planned and has been in use for several years since implementation. In short, despite the challenges the project was a success. To understand this challenging success we build on our descriptive application of PEMM in Section 4, to analyse and reflect on the development of process maturity through the course of the project in terms of the five enablers. Table II provides an overview of our analysis of the change in the maturity of the five enablers, which we describe further below.

5.2 Design

In terms of the development process itself, the persistence of the two alternative perspectives on the one process is an intriguing observation at AustGov (Figure 2). Despite attempts to produce a unified model of the process, AustGov chose to maintain two models of the same underlying process from different perspectives. At first glance this may be seen to be extremely inefficient in that it requires the constant reconciliation of the two process models lest the finance office and technical team's views of the underlying process become disconnected. On deeper reflection it can be seen that the tension between the two

Activity	Volume	Participants	Elapsed time (days)	Error rate (%)	Salary costs ($)	Non-salary costs ($)	Total cost ($)
1. Prepare cheque requisition	22,767	Admin. officer	1-2		27,410.44	2,769.79	30,180.24
2. Check GL account code	22,767	Finance officer	*	10-20	4,568.41	461.63	5,030.04
3. Create GL account code	2,276	Finance officer/ budget officer	*		685.05	69.22	754.27
4. Check supplier	2,2767	Finance officer	*	5	4,568.41	461.63	5,030.04
5. Create supplier	1,138	Finance officer	*		913.40	92.30	1,005.70
6. Verify cheque requisition details	2,2767	Finance officer	*	10	3,045.60	307.75	3,353.36
7. Provide correct details	2,276	Finance officer/ admin. officer	1-2		2,740.20	276.89	3,017.10
8. Check financial delegations	2,2767	Finance officer	*	5	4,568.41	461.63	5,030.04
9. Provide correct authorisation	1,138	Finance officer	1-4		3,196.90	323.04	3,519.95
10. Prepare batch	2,2767	Finance officer	*		4,568.41	461.63	5,030.04
11. Check and adjust batch	2,2767	CTL	*		3,898.38	393.93	4,292.31
12. Enter batch	2,2767	Admin. assist.	*		7,674.99	775.55	8,450.54
13. Check batch	2,2767	CTL	*	5	3,898.38	393.93	4,292.31
14. Rework	1,138	Admin. assist.	*		1,918.16	193.83	2,111.99
Total					73,655.14	7,442.77	81,097.91

Table I.
Sample process metrics

Table II. Analysis of the developing maturity of the PEMM process enablers

Enabler	Initial maturity	Project challenges	Project outcomes	Maturity achieved
Design Comprehensiveness of the process specification	The design enabler maturity level was P-1 The purpose of the process was unclear; it had not been analysed or documented on an end-to-end basis Process inputs and outputs, and the relevant suppliers and customers were identified at activity level, the process context was missing. No formal process documentation existed	Selection of a modelling technique Identifying process start and end points Achieving consensus on model content Divergent stakeholders with unreconciled needs	Agreed process start and end, activities and sequence Existing process modelled using an adaptation of trigger modeling Redesigned process modelled with separate user and technical versions	The maturity level of the design enabler improved to a minimum of P-2 The purpose and context of the process were explicitly identified; the process was redesigned end-to-end, customer needs were recognised and agreed upon Process documentation was complete; including linkages to other process, and to system and data architectures
Performers Knowledge, skills and behaviours of the parties involved in executing the process	The performers enabler maturity level was P-1 Performers had basic knowledge of the system and were able to identify key performance metrics, however they were lacking the basic skills necessary to diagnose and improve process performance, operating instead at a functional level. Performers behaviours indicated they had primary allegiance to their function, rather than the process	Two main user groups affected; finance office job was enriched, end-user job was impoverished. Models were revised to disguise these outcomes Loss of face-to-face activity handovers End users were excluded from the early stages of project	Hierarchical, highly regulated environment improved acceptance by performers Performers concentrated on problem solving and process improvements Performer behaviours indicated some on-going allegiances to their primary function, rather than to the process	The maturity level of the performers enabler improved to P-2 The knowledge of performers improved to a level where they were able to describe the processes overall flows. Performers acquired skills which allowed them to identify and resolve problems at a process level and performers behaviours indicated that they were considering process design and correctly performing process activities, however primary allegiances seemed to continue to be function rather than process oriented

(*continued*)

Enabler	Initial maturity	Project challenges	Project outcomes	Maturity achieved
Owners Clearly identified ownership of processes, and authority to plan and execute process change	The owners enabler maturity level was P-1 The identity of the process owner was ambiguous, creating situation where ownership activities such as process documentation were poorly understood and enacted. This lack of explicit ownership provided limited authority for the process owner to advocate for the process and initiate process change	Decision to redefine current practices using workflow functionality as justification Strategic exclusion of end-users	The process owner was responsible for initially convening the project team, and allocating and controlling the project budget Owner managed performers and "sold" outcomes politically	The maturity level of the owners enabler improved to a minimum of P-2 The identity of the process owner was clarified. The process owner had sufficient authority to control the process budget, and to strongly influence the initiation and completion of project activities. The process owner visibly supported the design and implementation of required process changes, and ensured ongoing compliance with process design requirements
Infrastructure Maturity of both information systems and human resource systems	The infrastructure enabler maturity level was P-1 The legacy information systems supporting the process were fragmented, as result the human resource systems (functional managers) were unable to assess performance or resolve problems in a process context	Vendor pressure to upgrade ERP suite Inability to message to corporate e-mail client Out of suite HR module caused addressing abilities Difficulty securing technical resources Escalation timing issues	The IT systems were eventually able to support the process workflows The re-designed process was used to redefine the jobs and roles of performers	The maturity level of the infrastructure enabler improved to a minimum of P-2 The functionality of the information systems was improved and integrated to effectively support the process design, and human resource systems included job and role definitions of the performers, based on process documentation
Metrics How well the process is measured	There was no definition of process metrics, as a result the uses of these metrics were nonexistent. Managers were unable to track process performance, or identify and improve process performance	Limited data on performance of current process	Project team developed metrics showing anticipated cost reductions of ~50 per cent Inappropriate job allocations identified Metrics used to improve process design	The maturity level of the metrics enabler improved to P-2 Process metrics were defined and although fairly basic, did include some quality metrics. These metrics were used to track and analyse performance of the redesigned process

Table II.

views provides a constant motivation for ongoing dialogue between the business and technical side of the project team. As such the duality of the modelling actually facilitated communication in a knowledge intensive task, with the dual models serving as useful boundary spanning objects in the interaction (Boland and Tenkasi, 1995; Levina, 2005; Levina and Vaast, 2005).

5.3 Performers

The project team involved a somewhat unusual group of performers; AustGov's workflow project demonstrates challenges in user involvement not previously documented in the literature (see Kujala, 2003 for a review of the obstacles to user involvement). Specifically, the case illustrates a strategic issue in the organisational context resulting from a mandate from management to not involve end-users. To the extent such issues exist in other contexts it may be a key indicator of project outcomes in regard to user involvement.

That the AustGov workflow project itself did not fail despite the lack of user involvement is arguably also due to AustGov's context. As a government agency, centrally driven change is the norm for AustGov. In organisations with a less hierarchical and regulated environment the deliberate exclusion of end-users from the process may have a far greater detrimental effect on project outcomes. In AustGov's case, the hierarchical and highly regulation-oriented environment meant that central finance office staff likely had a better understanding of the formal requirements of end-users in departments and divisions. Moreover, AustGov staff would be politically more accepting of centrally driven change without direct consultation. Thus, there was arguably less information to be gained from user involvement at AustGov, and less political need for such involvement.

5.4 Owner

The importance of the project owner in achieving a successful outcome cannot be understated, strong visible senior management support was vital. Although the decision to preclude end-user involvement may have been expected to create difficulties for the project team, the fact that senior management were also prepared to "run interference" on this aspect left the project team free to focus on the task at hand, rather than the political ramifications of that task.

5.5 Infrastructure

The AustGov project provides an interesting example of bundling projects which generate short-term and more immediate gains with larger longer term focused projects. In this case, the workflow system provided the necessary immediate returns to justify proceeding with the "related" ERP project for which the returns were less immediate. Although tensions were observed around multiple infrastructure issues (software version; e-mail client; user address data; technical support resources; escalation hierarchies) these issues were effectively identified, worked through and resolved by the project team. In several instances the project team accepted slightly sub-optimal short-term outcomes in order to allow the project to progress without losing sight of the bigger picture; the workflow process implementation project was after all a "proof of concept" for a larger project.

5.6 Metrics

The task of identifying and documenting process metrics played an important role, not only by providing a means of measuring and comparing current and future performance; but also by highlighting some inefficient resource allocations in the existing process. It became apparent to the project team that costly human resources were performing low value process activities. This increased understanding of the relative costs and responsibilities at an activity level fed back into the process re-design, resulting in the reallocation of some activities to less costly human resources.

5.7 Summary reflection

Figure 4 provides a summary of the degree of change in maturity of the five enablers. As illustrated in the figure, the process maturity improved in all dimensions, although not evenly. Furthermore, the overall maturity level achieved was relatively modest; around P-2 on Hammer's four point scale. Hammer (2007, p. 114) describes this level of maturity as "the process delivers superior results because the company has designed and implemented it from one end of the organisation to the other". However, the achievements in some dimensions were substantially greater than in other dimensions. Notably the different dimensions of the owner enabler in general saw the greatest increase, and the highest final level of maturity.

On reflection it should not be surprising that the dimensions of maturity relating to the owner enabler exhibit the greatest maturity. Arguably the biggest challenges faced by AustGov were not those relating to infrastructure, metrics, performers or design, but rather were political in nature. The political challenges occurred on multiple levels; the conflict between user views and technical views, the concerns surrounding the union negotiations, and more broadly the politics of the declining government funding. Championing of the project was thus crucial, and this is reflected in high levels of maturity in the identity and authority dimensions of the owner enabler. Notably, the next highest dimension was in documentation (part of design). The effective design documentation assisted also with the political challenge, for example by maintaining both user and technical models of the process the conflict was mollified and dialogue was enabled.

As shown in Figure 5, there were important interrelationships amongst the different enablers in how they influence each other in AustGov's efforts to succeed. The interrelationships observed at AustGov are shown in Figure 5. A strong project owner was able to drive an atypical group of performers to successfully redesign a high volume inefficient process. The process design encompassed perspectives covering dimensions of importance to both the infrastructure and performers enablers. Performers obtained sufficient leverage from the support of a powerful owner to obtain sufficient infrastructure resourcing for the project to proceed to implementation. Thoughtful use of metrics enriched both the process design and the ability to assess project success in fiscal terms by demonstrating the value added by the project to AustGov.

However, it appears that success is not simply contingent on the interactions amongst the portfolio of enablers. Rather, it seems that greater maturity is necessary in those dimensions of relevance to the sources of greatest challenge in a process transformation. Certainly this was the situation in AustGov's success in the face of significant challenges. It is clear that the relationship between process enablers, context, and success is in practice complex.

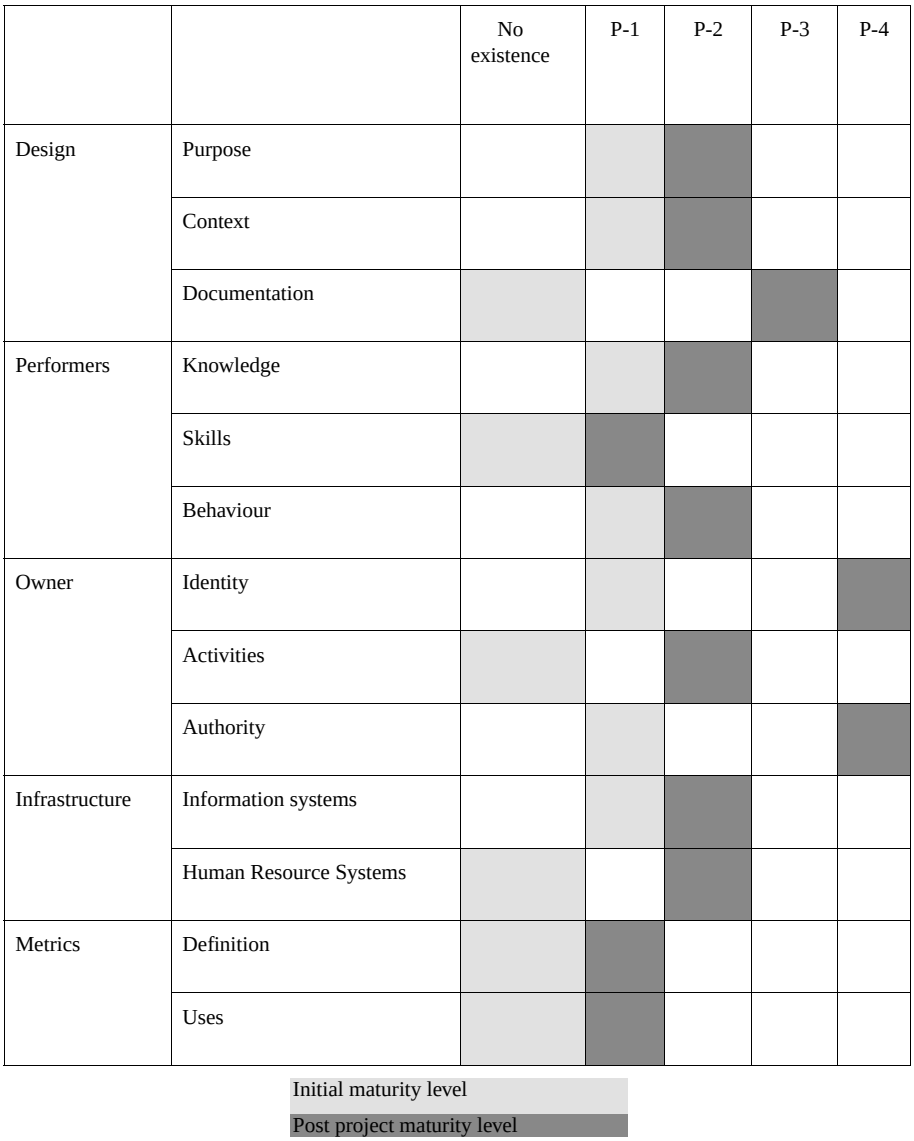


Figure 4.
Summary of changes in process maturity

6. Implications and conclusions

Our analysis of AustGov provides a rich study of a workflow project, and also a broader insight into the successful development and implementation of business process change projects more generally. We sought to understand how success emerged in a situation of conflicting forces more suggestive of project failure than success. Through the use of PEMM we have been able to explain in-depth the perplexing outcomes of the AustGov case.

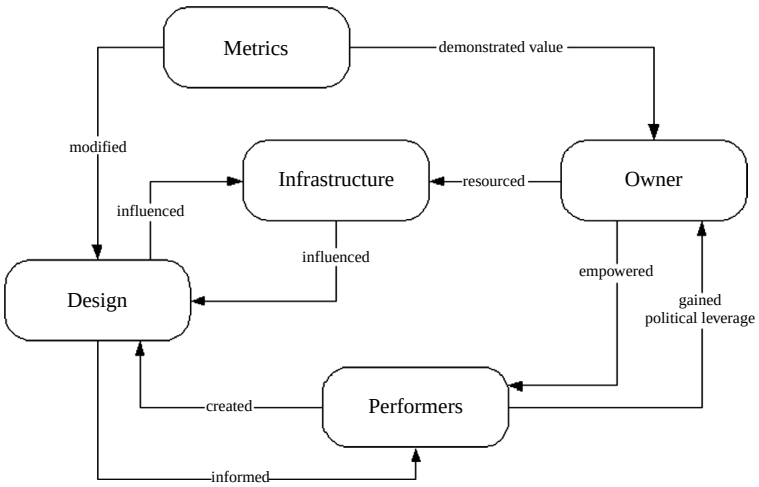


Figure 5.
Enabler interrelationships observed

Consistent with the PEMM perspective, we find that at a process level project outcomes reflect the maturity of the portfolio of interdependent process enablers. The PEMM "lens" highlighted the interactions amongst the various process enablers at AustGov and in this way explained how the success emerged despite the challenges. In AustGov's case the primary challenges were political. We attribute the success in the face of these challenges to development not only of a sufficiently mature portfolio of process enablers, but also high levels of maturity in those areas that influenced the primary challenges. In AustGov's case this was seen in the more advanced maturity in owner (identity, authority) and design (documentation).

More broadly, we provide a clear demonstration of the analytical value of Hammer (2007) PEMM, in a case context that pre-dates PEMM's publication. For practice, our application of PEMM to the AustGov case highlights the importance of developing more advanced maturity in enablers that can have bearing on the specific challenges of the given context of process transformation, a key insight. Our results evidence the need to consider the maturity of the portfolio of process enablers relative to the challenges faced. By considering the current level of maturity, and understanding the relationship between process enablers and obstacles to success, the practitioner can target their efforts to develop maturity levels across the portfolio to ensure success. The difficulty here is of ensuring adequate development of maturity in all process enabler dimensions, while achieving advanced development in those of particular relevance to the obstacles to success. Clearly a rich understanding of the interrelationships amongst the process enablers themselves, and as portfolio with the organisational context, is critical.

While the AustGov case is insightful when analysed from a PEMM perspective, it also raises important questions for future research. Further research is needed to better understand the myriad of influences between the process enablers themselves, and the context of application. Certainly PEMM provides a useful organising lens for understanding process change. Future research needs to advance this to develop a validated model that is predictive, as well as explanatory, as to success in process change initiatives. More specifically, are similar results observed in contexts beyond workflow implementation? More subtly, are there some challenges that cannot

be compensated for by appropriate maturity in relevant enablers, and indeed what are the set of relevant enablers for a given portfolio of challenges?

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