

Managing inter-project coordination within programs

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ABSTRACT

A key program/project management standard says that “an essential program management responsibility is the identification, rationalisation, monitoring, and control of the interdependencies between projects”. Yet the management of interdependencies between projects is seldom addressed as a separate issue in the literature. Most of the relevant materials that do exist are generally intermingled with discussions of wider issues of program management, and are therefore rather anonymously represented.

This paper assembles materials on inter-project coordination from the two most widely used standards on program management, and adds some materials from other sources in the literature. This assemblage indicates that, whilst some areas of project interdependency management are reasonably well represented, many others are not.

It indicates that there are apparent opportunities to develop more comprehensive, and distinctively represented, materials on the management of inter-project coordination.

An unanswered question is whether such development is likely to enhance the quality and utility of the literature on program management. I argue that the answer is “Yes”.

INTRODUCTION

An essential program management responsibility is the identification, rationalisation, monitoring, and control of the interdependencies between projects;... (PMI 2006a:7)

This quotation very clearly indicates that management of interdependencies between component projects is an essential component of program management. This appears to be incontestable, and flows naturally from most definitions of programs, which invariably include the attribute of comprising interdependent component projects.

....inter-project coordination does not appear as a separate issue in the program and project articles. (Artto et al 2009)

This second quotation indicates that this important component of program management does not receive the explicit attention in the literature that its importance appears to warrant. Instead, the relevant materials that do exist are

generally intermingled with discussions of wider issues of program management, and tend to be seen as just additional factors relevant to these issues.

This paper assembles materials on managing inter-project coordination from two key program management standards, namely the “*Standard for Program Management*” (PMI 2013b) and “*Managing Successful Programmes*” (OGC 2011), and adds some materials from other sources. Although these materials are not comprehensive, they should provide a solid base for further development of relevant materials, and for their consolidation into a major inter-project-specific element of program management.

In this paper I use terminologies such as “inter-project coordination”, “managing interdependencies between component projects”, “interface management”, “internal integration”, etc, interchangeably.

The following will mainly use the program management knowledge areas proposed in *The Standard for Program Management* (PMI 2013b) as headings for outlining what I have found in the literature which is specifically concerned with managing interdependencies. The only change I have made to the order in PMI 2013b is to elevate “Program integration management” to the head of the list, simply because the management of interdependencies between a program’s component projects appears to me to be the crucial internal component of program management.

PROGRAM INTEGRATION MANAGEMENT AND INTER-PROJECT COORDINATION

Evidently program integration management covers both the coordination (i.e. internal integration) of component projects, and the successful integration of program outputs into its environment, to produce the desired outcomes. Although there are, of course, interactions between the two, our concern in this paper is with internal integration, which I generally describe as inter-project coordination in the headings that follow.

PMI 2013b (*The Standard for Program Management* – 3rd Edition) discusses program integration and inter-project coordination quite specifically in its Chapter 1 Introduction. The following substantial excerpt from p. 7 encapsulates a good deal of these discussions.

In programs, the program manager needs to integrate and control the interdependencies among the components by working in five interrelated and interdependent Program Management Performance Domains: Program Strategy Alignment, Program Benefits Management, Program Stakeholder Management, Program Governance, and Program Life Cycle Management. Through these Program Management Performance Domains, the program manager oversees and analyses component interdependencies to assist in the determination of the optimal approach for managing the components as a program. Actions related to these interdependencies may include:

- Leading and coordinating common program activities, such as finance and procurement across all program components, work, or phases.

- Resolving resource constraints and/or conflicts that affects multiple components within the program;
- Communicating and reporting to stakeholders in a manner that reflects all activities within the program;
 - Responding proactively to risks spanning multiple components of the program;
 - Aligning program efforts with organisational/strategic direction that impacts and affects individual components, groups of components or program goals and objectives;
 - Resolving scope, cost, schedule, quality, and risk impacts within a shared governance structure; and
 - Tailoring program management activities, processes, and interfaces to effectively address cultural, political, and environmental differences in programs.

PMI 2013b also has a specific section *8.3 Program Integration Management* in its *Chapter 8. Program Management Supporting Processes*. This has seven sub-headings, but virtually nothing specifically on inter-project coordination,

OGC 2011 (*Managing Successful Programmes – 4th Edition*) does not discuss program integration management as a distinctive topic in its own right. However, its *Part 3 The Transformational Flow* (Chapters 13 to 19) has substantial materials which relate projects to certain program objectives and the like, but without substantive materials on inter-project coordination.

Dietrich 2006 points out that

The empirical studies on integration in multi-project contexts are relatively few, if any.

His own empirical studies unearthed the following integration mechanisms for the component projects of programs.

- Formal group mechanisms
 1. Regular program core team meetings
 2. Collocation of core persons
 3. Decision-making committees
- Informal group mechanisms
 4. Autonomous irregular face-to-face meetings (between several project managers)
 5. Facilitated informal meetings between several project managers
 6. Integration through informal interpersonal network meetings
- Formal personal mechanisms
 7. Integration via liaisons (project employees or project managers program coordinator)
 8. Integration through messenger (program manager)
 9. External consultant as a coordinator
- Informal personal mechanisms
 10. Direct contact between persons via e-mail or phone
 11. Direct personal face-to-face contact between employees or project managers
- Formal impersonal mechanisms
 12. Information exchange through reporting and formal documents

13. Integration through plans and schedules
14. Organising: definition of roles, responsibilities
15. Information data base

Dietrich 2006 also discusses the effects of uncertainty and complexity on his findings. Uncertainty and complexity inevitably lead to changes in the program and its component projects. Dietrich's findings are a little too detailed to be conveniently summarised here, but the following gives some idea of what he found.

The results of the study suggest that high uncertainty increases the importance of an informal group mode of integration and a formal personal mode of integration. In addition, the results reveal that the high level of uncertainty decreases the importance of formal impersonal integration mechanisms and informal personal integration mechanisms.

I have not found any other empirically derived data on integration mechanisms in the program context. Neither is there a great deal on experience-based mechanisms.

Overall: There is not very much material in the literature on integration of component projects as a distinct topic in its own right. The following analysis of more detailed aspects of program management is concerned with identifying relevant materials that are embedded there-in.

PROGRAM BENEFITS MANAGEMENT AND INTER-PROJECT COORDINATION

PMI 2013b mentions inter-project coordination in several places in Chapter 4. Program Benefits Management. However, the sense of most of these is quite general, as exemplified in the following bullet point (from amongst six on p. 33), which says that:

....the program manager employs Program Benefits Management to continually...

- monitor the interdependencies between the outputs being delivered by the various projects within the program and how those outputs contribute overall to the program's benefits.

PMI 2013b also discussed what is often called "incremental benefits realization", which essentially covers benefits which are delivered via component project completions during the operational stages of the program. It also acknowledges that some programs deliver benefits only after all of the component projects have been completed.

OGC 2011 discusses some aspects of project-program coordination in several different places – e.g. *7.6 Benefits management within the transformational flow*, *17.4 Align projects with benefits realization*, *18.2.2 Monitor benefits realization*. However, there is little material directly on inter-project coordination.

Murray-Webster & Thiry 2000 also discuss incremental benefits realization:

Benefits are delivered incrementally by each project and action undertaken during the life cycle of the programme; they can correspond to a product, a strategy, a market opportunity, a change process or even the organisation's survival.

Pellegrinelli et al 2011 make much the same point,

The structure and content (hypothesis) of the program are intended to facilitate staged, incremental benefits realisations concurrent with capability development...

However, neither publication gives substantive detail on what is involved for inter-project coordination in realising such incremental benefits.

Overall: Inter-project coordination in the program benefits management context is evidently mainly concerned with integration of program/project outputs into the program environment. Implications for ongoing internal inter-project coordination are not spelt out, but this may represent an opportunity area for further development.

PROGRAM STAKEHOLDER ENGAGEMENT & INTER-PROJECT COORDINATION

PMI 2013b has little to say on inter-project coordination specifically in the context of program stakeholder engagement. This is perhaps a little unexpected, in view of the likelihood that some component projects would share certain stakeholders, in which case inter-project coordination would most likely be required from time to time.

OGC 2011 is rather more specific. Under the heading *6.5 Communications with the projects and other programmes*, it says:

Whilst projects within the programme will need to communicate with their local stakeholders, the programme will need to control this to ensure that the communications are consistent, clear, timely and accurate.

A good place to start is with some general stance or policy within the stakeholder engagement strategy Some typical examples of solutions are:

- Certain identified stakeholders are always referred to the SRO or to the programme manager, or the person in the programme specifically responsible for maintaining the relationships with these stakeholders
- Certain stakeholders may have nominated 'custodians' through which all communications are channeled
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[The remaining bullet points are concerned with more general aspects of communications, and will be discussed under that heading shortly]

Prieto 2011 has the most detailed direct coverage I have found on coordination of component projects in the stakeholder management context. His concerns are with large engineering and construction programs, but the basic approach he develops would appear to be applicable to a very wide range of program management application areas. He discusses six steps in program stakeholder management, as follows.

- Step 1** – Stakeholder identification
- Step 2** – Stakeholder mapping
- Step 3** – Stakeholder issues
- Step 4** – Stakeholder objectives
- Step 5** – Stakeholder engagement
- Step 6** – Stakeholder management

Prieto's approach to coordinating stakeholder management of component projects with overall program strategies is embedded in each of these steps, and is rather too detailed to attempt to summarize here. It is the most comprehensive coverage I have seen, and is strongly recommended as a reference source.

Lycett et al 2004 say that MSP (*Managing Successful Programmes* - OGC 1999) made the point that stakeholders will come and go during the course of a program. This could also impact on inter-project coordination in the stakeholder management context.

Overall: There are reasonably substantial materials in the literature on inter-project coordination in the context of program stakeholder management. There could well be potential benefits in further consolidation of these materials.

PROGRAM GOVERNANCE AND INTER-PROJECT COORDINATION

The provisions made for governance of a program could be expected to impact on the coordination of the program's interdependent projects – or perhaps vice versa, as the types and mixes of component project interdependencies in any given program should help shape the most appropriate program governance arrangements.

PMI 2013b discusses program governance under six main sections. In its section 6.4 *Common individual roles related to program governance*, it points out that

....the project manager is subject to component governance oversight by the program manager (acting in a role analogous to the of the program governance board) ...

There is little detail about governance which directly relates to inter-project coordination, except perhaps for a short section on *Program Quality Standards and Planning*, which will be discussed later under the Quality heading.

OGC 2011 has rather an eclectic set of governance themes in its Part 2. In a chapter on program organisation, it makes the point that "There is no single programme

organisation model that will fit every type of programme". Its section 4.14.4, *Integrating programme and project structures*, discusses three different scenarios which are essentially represented as three different governance structures.

Prieto 2008. On a specific issue which is often included in governance topics, Prieto has a section on program audits which is relevant to a program's component programs, in which he says,

Program management [audits] assure that program and technical requirements are met not only by the Program Manager but also by the individual program activities and defined projects.

Overall: There is quite a lot of material on program governance at large, but little detail about governance arrangements which relate to inter-project coordination. Perhaps this is hardly surprising, as inter-project coordination would appear to be dominantly a management responsibility, rather than a governance one.

PROGRAM COMMUNICATIONS MGT. AND INTER-PROJECT COORDINATION

PMI 2013b has a dedicated section program communications management under *Program management supporting processes*. However, there is little material on inter-project coordination in the communications context.

OGC 2011. As noted above in relation to program stakeholder management, OGC 2011 has a heading *6.5 Communications with the projects and other programmes*, from which I quoted materials particularly related to stakeholders. Continuing with that quotation, the remaining three bullet points are concerned with more general aspects of communications in the context of inter-project coordination.

- Certain topics identified as 'sensitive' must always be referred up to the programme for communication, e.g. industrial relations
- Regular communications briefings are given to constituent projects so that they stay on message (e.g. via the provision of presentation packs)
- Wherever possible, project communications are aligned with the overarching program communications plan.

Whatever the approaches taken, care should be taken to allow the projects to manage their own communications whenever this is reasonable. Too much control of communications by the programme can easily disempower the projects as well as generating new sources of discontent from stakeholders within the projects themselves.

Aritua et al 2008 make the following observations about information sharing amongst component projects in the context of change.

Increased information-sharing among project teams and organizations impacting on the objectives of a multi-project environment will allow projects to self-organise to respond to changing business conditions. ... Project managers must be constantly aware of how their projects fit into the evolving strategy.

I have not seen a more relevant comment about information sharing relating to a program's component projects.

Overall: There are some materials on inter-project coordination in the program management communications context. Perhaps there are still some opportunities for consolidating relevant materials.

PROGRAM FINANCIAL MANAGEMENT AND INTER-PROJECT COORDINATION

PMI 2013b has quite a lot to say about component projects in the contexts of cost estimation, cost budgeting, and financial monitoring and control, including such contexts as program payment schedules and component payment schedules, costs reallocation impact and results between components, identifying impacts to the program components from overruns or under-runs, and the like.

Substantial inter-project coordination is involved with these and other contexts, but I did not find more specific guidelines.

OGC 2011 does not have any substantive materials on program financial management.

Prieto 2008 makes a rather general statement about how program financial management differs from that on projects.

Program management also requires a focus on overall program finances that transcends the considerations found on any one project. Finance, treasury and comptroller-type activities are integral to successful program management.

Overall: There are obviously many aspects of program financial management which involve coordinated management between a program's component projects, and it would be helpful to have more materials on these.

PROGRAM PROCUREMENT MANAGEMENT & INTER-PROJECT COORDINATION

PMI 2013b discusses inter-project coordination, particularly in program procurement planning, as follows (in part):

Through the planning activity, the program manager looks all program components and develops a comprehensive plan that optimises the procurements to meet program objectives and for the delivery of program benefits. To do this, program procurement management addresses commonality and differences for the various procurements across the program scope and determines:

- Whether some of the common needs of several individual components could best be met with one overall procurement rather than several separate procurement actions;
- The best mix of the types of procurement contracts planned across the program;

- The best program-wide approach to competition;
- The best program-wide approach to balancing specific external regulatory mandates;

OGC 2011 has little to say about program procurement management.

Prieto 2008 adds to PMI's approach above by pointing out that there are many opportunities for doing advantageous deals in the program procurement context:

Program management provides the opportunity to achieve increased leverage on total spend through consolidation of select procurement activities related to major commodities, common equipment and major services.

Prieto expands on this a little in the context of a programs' component projects (under the heading of "Materials Management") as follows.

Program management affords the opportunity to leverage procurement of select materials and services across multiple projects. Concomitant with such a strategy is the need to track, receive, store and dispatch such materials across multiple projects at multiple points in time until such materials have been incorporated into the permanent construction.

Such leverage opportunities are about the only references I could find in the literature which were relevant to coordination between component projects in the procurement context.

Overall: It seems reasonable to suspect that there is more to be said about inter-project coordination in the program procurement management context.

PROGRAM QUALITY MANAGEMENT AND INTER-PROJECT COORDINATION

PMI 2013b has a separate full section on program quality management, but the most relevant material on inter-project coordination appears to be a short section in its Governance chapter, *6.2.9 Program Quality Standards and Planning*, which includes:

The purpose of such a plan [quality program plan] is to establish appropriate mechanisms for ensuring program quality by identifying and applying cross component quality standards. The program quality plan defines;

- Minimum quality criteria and standards to be applied to all components of the program;
- Minimum testing or validation requirements for all component outputs or outcomes;
- Minimum requirements for quality planning, quality control, and quality assurance by components;
- Any required program level quality assurance or quality control activities; and
- Roles and responsibilities for required program level quality assurance and quality control activities.

There is a close coupling between this section and procurement planning, as both can benefit from the standardisation of products, standards, and tests, and in establishing economies of scale for acquiring these items.

OGC 2011 has a chapter on program quality management (Chapter 12). It makes the point that

Programme-level quality must take into account the need to ensure that the project-level quality is delivering fit-for-purpose capabilities which enable the programme to deliver the outcomes and benefits.

However it has little detailed guidance about inter-project coordination with quality management.

Pellegrinelli 2011 says:

Quality (fit for purpose) and performance levels are subject to review and change, typically at, but not restricted to, end of tranches, in the light of internal and external factors (e.g. competition, consumer attitudes and/or new technology).

This quotation indicates that managing quality aspects of component projects can be quite a demanding task in dynamic environments.

Overall: It appears that more materials on inter-project coordination in the context of program quality management would be useful.

PROGRAM RESOURCE MANAGEMENT AND INTER-PROJECT COORDINATION

Managing program resources is one of the most frequently discussed topics in the program management literature. According to Engwall & Jerbrant 2003,

The *resource allocation syndrome* is the number one issue for multi-project management

PMI 2013b has a section 8.6.3 which is specifically concerned with *Resource Interdependency Management*.

OGC 2011 discusses program resource management in several places, particularly under 9 Planning and Control, and 16 Managing the Tranches. These are helpful in general, but a little lacking in detail.

Prieto 2008 points out that

Program management involves prioritization and allocation of resources across multiple and in some ways competing projects.

Turner & Speiser 1992 propose a 6-step process for managing the prioritisation of resources across projects in a program:

1. Develop individual project plans, at the strategic (or milestone) level

2. Determine the resource requirements and durations of the individual projects, at that level
3. Incorporate each individual project into the rough-cut capacity plan (or master schedule) as a single element of work, assuming the resource profile and duration calculated in Step 2
4. Assign a priority to each project according to its resource requirements and its contribution to the overall programme objectives
5. Schedule the individual projects in the MPS [Master Project Scheduler], according to their priority, and assign them a time and resource window
6. Manage the individual projects to deliver their objectives within the time and resource window assigned

This approach appears to be very appropriate to program resource management in the context of managing the interfaces between its component projects.

Overall: There appears to be substantial material on inter-project coordination in the context of program resource management. Some further consolidation could be helpful.

PROGRAM RISK MANAGEMENT AND INTER-PROJECT COORDINATION

Risk management is part and parcel of any program and constituent projects. Two primary standards on program management, PMI 2013 and OGC 2011, have considerable material on risk management, including inter-project coordination.

PMI 2013b has substantial material on inter-project coordination in risk management. Following are some relevant extracts.

Risk analysis at the program level should integrate relevant program component risks. Managing the interdependencies among the component risks and the program provides significant benefits to the program and the projects.

The program management team should not assume the authority and responsibilities of the component level management team by managing risks that should be managed at the component level. Component managers manage project level risks. They are escalated to the program level only when

- (1) project level risks cannot be resolved by the project management team at the component level, or
- (2) project level risks would be managed more effectively at the program level because they affect more than one project or require a higher level of authority to be resolved.

Risks are further analysed at the component level to determine if they have an impact outside of the component.

OGC 2011:136-7 cites eight typical areas of risk and issues within a program, including

- Aggregating threats from projects
- The management of interdependencies between the programme and its projects, ..

It goes on to say that the programme should set the risk and issue management standards for the project and then give staff the authority to manage their risks and issues within these parameters. ...

To manage the risks to projects well, the programme needs to ensure that each project brief outlines the risks from the perspective of the programme and then to request the project to provide regular feedback to the programme's risk management activities.

Inter-project coordination is discussed or mentioned in many other sections in *Chapter 11 Risk and issue management*.

Prieto 2008 puts the place of risks in relation to component projects rather well in this quite general observation.

Program management is not just the sum of all project management activities but also includes the management of risks, opportunities and activities that occur "in the white space" between projects.

Program contingency management is normally linked quite intimately with program risk management. PMI 2013b says,

The program contingency reserve is not a substitute for the component project contingency reserve, which is held at the component level.

Prieto 2008 points out that, in programs/projects with high uncertainty levels,

Program management often employs shared contingency programs for critical projects with high uncertainty levels. Such programs incentivize project performance while providing increased cost certainty and a program level.

Issues management is often discussed under risk management, but I have not found any materials directly relevant to inter-project coordination, in spite of an expectation that this would be an obvious area for issues to arise.

Overall: There are very substantial materials in the literature on inter-project coordination in the context of program risk management.

PROGRAM SCHEDULE MANAGEMENT AND INTER-PROJECT COORDINATION

Program scheduling gets substantial attention in the literature, and it is widely acknowledged in a general way that inter-project coordination is a major part of what program schedule management is all about.

PMI 2013b acknowledges that "The dependencies amongst the various components have significant impact on the overall schedule". In more detail, it says

While project managers concentrate on managing their project's deliverables to a baseline schedule, program managers concentrate on coordinating all of the component schedules within the program and integrating them to ensure the program itself completes on schedule. Rather than manage the details of any single project component, the program manager concentrates on the integration of each component into the program master schedule and on the timely delivery of the program level components.

OGC 2011 advocates developing program schedules by grouping component projects into tranches, and develops this approach in some detail. Evidently this approach was also used in IBM (Strange 1998d) according to Lycett et al 2004, who note that, in both cases,

.....it is suggested that projects are implemented in a series of groups [tranches], with periodic review points following each grouping. In outline terms, this idea relates to the concepts of evolutionary project management and rolling wave planning, thus providing some mechanisms for business alignment.

Prieto 2008 makes some provision for re-sequencing in his discussion of program sequencing.

Sequencing of programmatic activities including defined projects; re-sequencing of projects and other programmatic activities as within any programmatic activities as required to achieve the required strategic business outcome.

Overall: There is substantial acknowledgement of the need for program managers to coordinate and integrate component project schedules, but rather less detail on how one goes about this, particularly when the program scope cannot be defined in detail at, or near, the outset of the program.

PROGRAM SCOPE MANAGEMENT AND INTER-PROJECT COORDINATION

It is noted here that the prominent UK standard, *Managing Successful Programmes* (OGC 2011) does not refer to program scope at all, whereas program scope management features prominently in PMI 2013b, being the subject of section 8.9.

PMI 2013b says that

The objective of program scope management is to develop a detailed program scope statement, break down the program work into deliverable components, and develop a plan for managing the scope throughout the program.

A program work breakdown structure is a deliverable-oriented hierarchical decomposition encompassing the total scope of the program, and it includes the deliverables to be produced by the constituent components.

Scope changes are one of the constants on programs and projects, and in the program context a scope change inevitably has follow-through impacts on related component projects. PMI 2013b says

Scope changes that have significant impact on a component and/or the program may originate from stakeholders, components within the program, previously unidentified requirements or architecture issues, and/or external change.

However, its discussions on how to handle scope changes in the context of inter-project coordination is somewhat generalised.

Prieto 2008 says that ongoing assessment is required of the impact of change, whether externally driven or the result of performance in one or more of the program activities or defined projects.

He recommends use of a Change Impact Assessment (CIA) system which analyses the effects of change on productivity, and on disruption between component projects.

Some authors criticise the *PMBOK Guide* for taking for granted that there is a defined scope of work for each project and that it needs to be determined as soon as possible, ideally before the project starts. For example:

Thiry 2010 and **Pellegrinelli et al 2011** say that the program situation is complex, and subject to high ambiguity and uncertainty, and, with regard to program scope, the latter say:

Scope is left open as far as possible, and decisions taken as late as possible to create real options, flexibility, and the ability to respond to changing circumstances.

However, there is little guidance on how one goes about coordinating the scope dimension between component projects in this context.

Overall: There appears to be an opportunity to develop more explicit materials on inter-project coordination in the context of program scope management.

SUMMARY TABULATION OF INTER-PROJECT COORDINATION MATERIALS FOUND

Integration management and inter-project coordination

PMI 2013b. The Introduction has a good general summary of what is involved in inter-project coordination, but little specific materials, Section 8.3 Program Integration Management

OGC 2011 does not discuss this as a topic in its own right, and has little material directly on inter-project coordination.

Dietrich 2006 developed 15 practical transactional mechanisms (under five categories) from empirical studies. He also discusses change-related effects of uncertainty/ complexity on choice of mechanisms.

Overall, there is limited material on integration of component projects as a topic in its own right. Following are some materials from other knowledge areas.

Benefits management and inter-project coordination

PMI 2013b & OGC 2011 do not have substantive detailed materials on inter-project coordination in the benefits management context. Several sources discuss staged, incremental benefits realisation via projects.

	<p>Overall, the focus in the literature is on external integration of program/project outputs in the program environment. Implications for ongoing internal inter-project coordination might be an opportunity area for further development.</p>
Stakeholder management and inter-project coordination	<p>PMI 2013b has little specific material on inter-project coordination. OGC 2011:6.5 is a little more specific, but still rather sparse. Prieto 2008 develops six-step approach directly addressing coordination of component projects. Some others refer to changes of stakeholders during the program, without spelling out what is entailed for inter-project coordination. Overall, further consolidation of available materials could be useful.</p>
Program governance and to inter-project coordination	<p>Overall, there is not very much material on governance which directly relates inter-project coordination, perhaps because this is primarily a management responsibility, rather than a governance one.</p>
Communications management and inter-project coordination	<p>PMI 2013b has a dedicated section on program communications management but little directly relevant to inter-project coordination. OGC 2011:6.5 has some relevant materials. It recommends allowing projects to manage their own communications, whenever this is reasonable. Aritua et al 2008 say increased information sharing should allow projects to self-organise to respond to change. Overall, there appear to be opportunities for consolidating existing materials.</p>
Financial management and Inter-project coordination	<p>PMI 2013b has quite a lot to say about component projects re cost estimating, budgeting, and financial monitoring and control, including such contexts as program and project payment schedules, cost reallocation impacts, over-run/under-run impacts, etc. OGC 2011 does not have substantive materials on program financial management. Overall there are many aspects of program financial management which involve inter-project coordination, and it would be helpful to have more materials on these.</p>
Procurement management and inter-project coordination	<p>PMI 2013b discusses inter-project coordination, particularly in planning stages. OGC 2011 has little to say about program procurement management. Prieto 2008 discusses opportunities to leverage procurement across multiple projects. Overall, there are evidently opportunities for further contributions in this area.</p>
Quality management and Inter-project coordination	<p>PMI 2013b discusses inter-project coordination in its section 6.2.9 OGC 2011 has some rather generalised materials; and brief mention of configuration management. Pellegrinelli 2011 briefly discusses fitness for purpose and performance review and change. Overall, more inter-project materials in program quality mgt. would be useful</p>
Resource management and Inter-project coordination	<p>PMI 2013b has a section specifically on resource interdependency management. OGC 2011 has some relevant materials in Chapters 9 & 16.</p>

	<p>Turner & Speiser 1992 propose a 6-step process for managing the prioritisation of resources across projects within a program. Overall there are substantial materials on inter-project coordination re resources</p>
Risk management and inter-project coordination	<p>PMI 2013b has substantial materials on inter-project coordination in risk mgt. OGC 2011 also discusses inter-project coordination in Chapter 11. Prieto 2008 discusses contingency management. Overall there are substantial materials on inter-project coordination in risk mgt.</p>
Schedule management and inter-project coordination	<p>PMI 2013b points out need for inter-project coordination re schedules OGC 2011 & others recommend grouping component projects into tranches for program scheduling, but there is little on on-going inter-project coordination. Prieto 2008 discusses re-sequencing component projects. Overall the need for effective inter-project coordination re schedules is widely acknowledged, but more detailed how-to-do-it materials would be welcome.</p>
Scope management and inter-project coordination	<p>PMI 2013b has generalised discussions on program WBS and scope changes. OGC 2011 does not discuss scope. Prieto 2008 recommends a Change Impact Assessment (CIA) system. Thiry 2010 & Pellegrinelli et al 2011 discuss keeping scope open as long as possible in conditions of uncertainty. Overall there appear to be opportunities to develop more specific materials.</p>

DISCUSSION

At the present time, materials on inter-project coordination are commonly intermingled with discussions of wider issues of program management. Yet the management of interdependencies between projects is widely acknowledged as a unique and key component of the program manager's task. This paper has assembled materials from the program management literature that are directly concerned with the management of interdependencies between a program's component projects. The main focus has been on materials in the "*Standard for Program Management*" (PMI 2013b) and "*Managing Successful Programmes*" (OGC 2011), but some materials from other sources have been added.

With limited time and resources available to the author, this is not, and does not claim to be, a comprehensive assemblage of materials on inter-project coordination. However, it does appear to comprise a solid basis for further development of the subject. This examination has indicated that there are many opportunities to develop more comprehensive materials specifically concerned with inter-project coordination.

It should also be emphasised that this is only part of the story on inter-project coordination. Stretton 2013d developed a two-type classification of inter-project

interdependencies in a program, which were termed transactional, and change-related.

Transactional aspects of inter-project coordination

The management of transactional interdependencies covers the normal vicissitudes which inevitably occur in the relatively complicated environment of programs and their interdependent component projects, and include task-related and sharing-related interdependencies. The majority of the materials on inter-project coordination assembled in this paper have been transactional in nature.

Change-related aspects of inter-project coordination

Change-related interdependencies include the management of significant changes in the program, and dealing with consequent escalated issues among the projects that comprise the program, particularly those commonly associated with risk management activities. Some relevant materials on program risk management have emerged from this enquiry, but there is little material in the literature on how changes due to risk management activities (or from any other causes) will affect other program management components, and how to go about managing these changes.

Handling changes in a systematic way is complicated enough even within a single project (see Stretton 2013m), and there is not a lot of detailed material in the literature on how to go about that. It is so much more complicated with a program, where there is even less material about how to manage changes. I believe we badly need useful guidelines on change-related aspects of inter-project coordination.

Adding transactional and change-related aspects together, there appears to be an unanswerable case for developing more comprehensive materials specifically on the management of inter-project coordination within programs, and for grouping these into a distinctive package to help program managers become more effective in this key area of program management.

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