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TREASURY

TOTAL ASSET MANAGEMENT

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POST IMPLEMENTATION REVIEW GUIDELINE

1 Introduction

1.1 Background

The Post Implementation Review (PIR) process collects and utilises knowledge learned throughout a project to optimise the delivery and outputs of future projects.

A PIR can be used on projects ranging from the design and construction of buildings to the development of an asset strategy or an asset register.

PIR is a process, a tool and a means of collecting and communicating information. A PIR can be used to evaluate all stages in the asset life cycle.

This document provides a generic structure for NSW public sector agencies when conducting PIR studies. The objective is to define the principles, practices and outcomes of PIR studies to develop a feedback mechanism to optimise decision-making on future projects.

The guideline provides a generic structure to provide flexibility to permit the PIR process to be tailored to:

- the service delivery requirements and outcomes required by an individual agency
- the objective of the review (efficiency, effectiveness and outcomes of the project/program)
- the size, location and complexity of the project/program.

This guideline will assist those either performing a PIR in-house or commissioning a PIR from an external consultant. It provides assistance on preparing a PIR brief, monitoring the progress of the review team and judging the efficiency and effectiveness of the completed product.

A PIR generally follows a simple process. However the process can develop into an elaborate system, as even a simple project is a diverse collection of an almost unlimited number of variables. To overcome this complexity, it is essential to have a clear focus on the objectives of the review, its composition and the likely applications of the review's findings.

1.2 Alternative review strands

This guideline is structured around the PIR process, and includes a second review process, more limited in its focus, the Post Completion Review (PCR).

Post implementation review (Did the agency get what it needed?)

PIR is a comprehensive feedback mechanism designed to assess project outcomes. This assessment focuses on how well the project outcomes were matched to the actual needs that the project aimed to fulfil.

This evaluation will indicate how well the agency communicated (through the project brief) the project outcomes and how well these were achieved.

Post completion review (Did the agency get what it asked for?)

PCR systematically and rigorously compares the actual performance of the project outcome with the stated objectives of the original brief. The PCR process seeks to identify ways to improve future project conception, design development, and implementation.

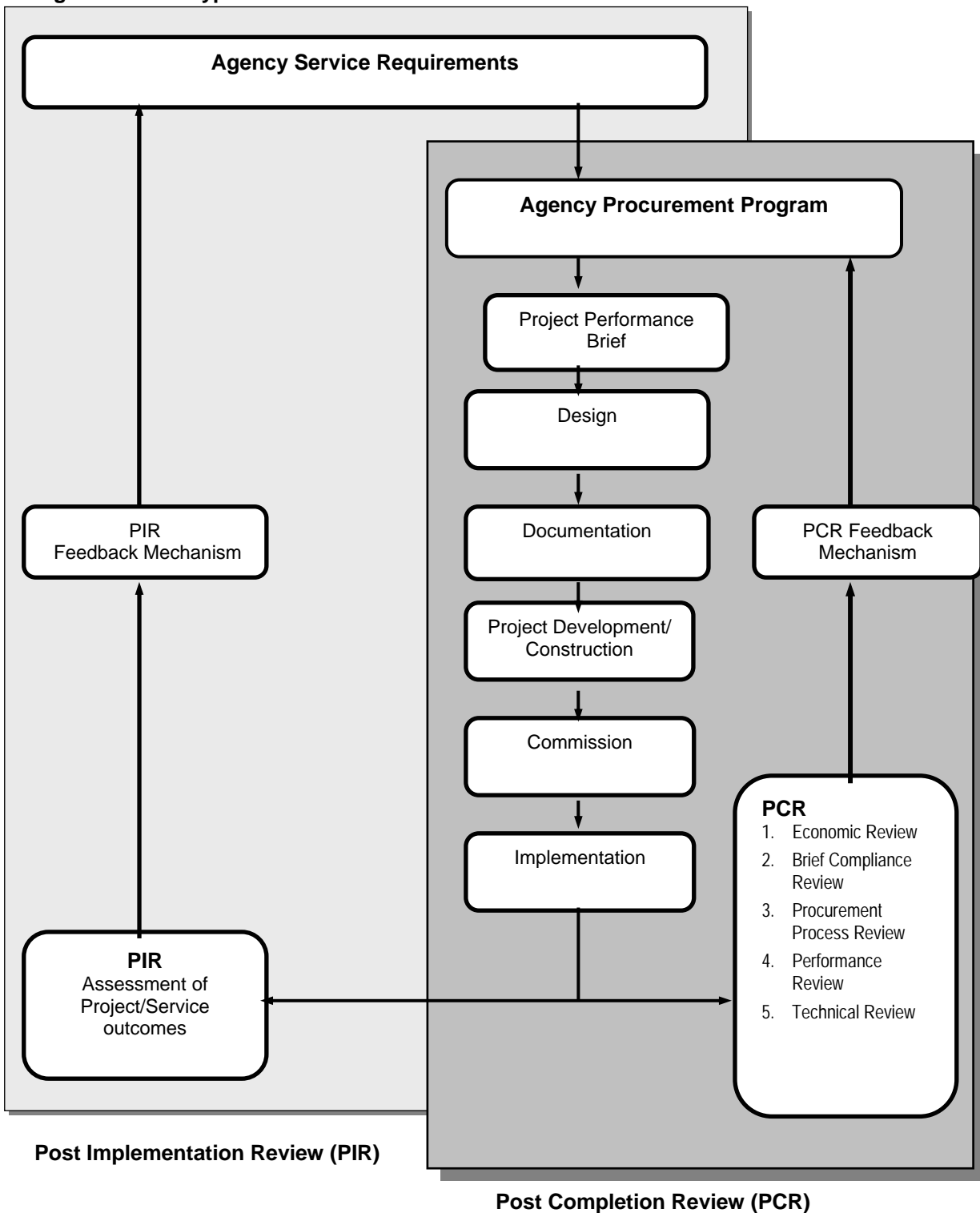
A number of strands of PCR exist including;

- Economic Review
- Brief Compliance Review
- Procurement Process Review
- Performance Review
- Technical Review.

Figure 1 describes the relationship between the two mutually exclusive strands of PIR. Commonality of various components of the two strands provides both the basis for a mutual sharing of information, and the desired information linking the two strands.

While the conceptual diagram (Figure 1) shows a total feedback process, clearly there is feedback between each of the strands. Any “Continuous improvement” and achieving “best practice” is only achievable if effective feedback mechanisms are developed.

Figure 1 Types of Evaluation



A fully developed model of PIR should be linked to an information management system that focuses on the management of information and the easy application of PIR feedback for the continuous improvement of the planning, procurement and implementation processes. This system needs to be able to integrate the results of a PIR with other relevant project material and make it available to the right people, at the right time and in the easiest form for application to future projects. The process of combining the outcomes of a number of PIRs into a resource tool is very often assumed. However this is not the case and will require careful planning and evaluation by the individual agencies if maximum value is to be obtained from a series of completed PIRs.

1.3 Successfully implementing Post Implementation Review Strategies

The implementation of an effective and successful PIR will require the dedication of those involved in the review process, access to all relevant information and personnel, and finally a commitment to apply the knowledge learnt from the study.

During the course of a PIR stress that criticism of specific individuals is undesirable and counter productive. A PIR should not be used to find fault or apportion blame. A professionally performed PIR should provide a balanced assessment focusing on positive and negative feedback. This focus on an overall constructive feedback process should be emphasised throughout the review process.

The involvement of decision makers in the PIR will help to overcome the feeling that they themselves are being evaluated. Project decision makers should be used as an information resource able to answer questions about the history of the project.

The PIR need not be limited to new or recently completed projects. A project may be significant if it seems to be performing exceptionally, effectively or poorly, or it is a key service delivery resource. Formal evaluation of any asset may provide information that could be the basis for improving the economical operation and maintenance of all asset types.

There are a number of reasons why PIR is not pursued more effectively:

- at the end of each phase of a project the assembled team disbands and moves quickly to the next project
- long project timeframes. Some asset based projects can have extensive timeframes between feasibility and occupation. (Up to 3-5 years)
- due to the long turnover period many of the factors that produced the original asset solution change. These factors include service delivery requirements, political factors, budget, state of the economy, industry practices, etc.
- where projects exhibit shortcomings there is an unwillingness to expose participants to perceived "criticism"
- in an increasingly litigious society criticisms may be taken as libellous
- there are rarely funds for effective and continuous PIRs
- PIR itself is often seen as ineffective. Overly complex and long-winded studies are perceived as time wasting
- the asset management industry has not developed a culture of critical examination and evaluation
- there is no effective mechanism for developing a "collective" reference system. Compare for example the legal and medical professions with their extensive case histories.

To successfully conduct a PIR a number of key points should be considered by the project team:

- what decisions are key to improved project value?
- who makes these decisions?
- when and where are these decisions made?
- what issues impact on them?
- what other reference material is used?

Generally agencies should aim to review between one in five and one in ten of all completed projects. All pilot projects or projects involving innovative procurement systems should be evaluated. These guidelines provide a broad range of techniques to assist agencies in developing a PIR. However, the final responsibility for implementing a PIR remains with each agency.

In overview the following key points should be considered:

-
- PCRs of the design and construction of built assets are best undertaken when the project has been occupied for two to five years
 - more numerous indicative studies are preferred to fewer investigative studies
 - employ a range of techniques to demonstrate the validity of the findings
 - involve the original design development and procurement team if possible
 - project users have strong opinions about their projects and are a valuable source of feed-back
 - PCR can be cost-effective and a range of simple survey techniques are available
 - develop a “keyword” classification system to group and sort feed-back issues
 - there has to be an organisational commitment to respond to the feedback.

Ultimately a PIR program is a continuous, repetitive and divergent process. As one project PIR is completed and its findings applied, new projects are completed. This requires a continuous cycle of PIR. To obtain the maximum benefit from a continuous PIR program an information feedback system will need to be adopted to suit the purposes of each individual agency. (Refer to section 5 PIR Outcomes).

1.4 Benefits of performing a Post Implementation Review

Post-Implementation Reviews are the last step in the project delivery process and represent closure of the feedback loop. PIR means the lessons learnt from previous projects are fed-back into the process, to benefit future projects. Given the massive resources expended in both asset and non-asset procurement it is a serious criticism that feedback is not pursued more diligently. Undertaking a PIR can generate both short and long term gains. Short-term gains include:

- identification of ways to improve the functional value of a project
- identification of ways and means to assist asset users overcome occupational problems and
- increasing user morale through the continuous improvement of asset created environments.
- Longer-term gains may include:
- learning from precedent
- Economies resulting from improved project performance
- improved concept criteria and project briefing
- development of more precise design criteria; and
- improved decision-making.

Undertaking a PIR gains information and understanding, which can be used to improve project decision-making. A successfully completed PIR may or may not result in a recommended action plan. In its simplest form, it will provide a forum for discussion and the basis for improved understanding between members of a project team. A more complex PIR may extend the current body of knowledge to the agency or beyond it to the industry in general.

2 Selecting an appropriate strategy

Post Implementation Review is a generic description of a range of reviews, or evaluations, which vary with the key stakeholders in the performance of a project. A clear understanding of the purpose of the review is a prerequisite for successful implementation. Generally reviews are either defined as Post Implementation Review or Post Completion Review.

2.1 Post Implementation Review

A PIR is designed to evaluate how well the brief predicted project delivery requirements. In a rapidly changing environment many projects, that meet the briefed requirements, perform poorly because service requirements have changed dramatically.

This is caused by the inability to accurately predict project requirements not the quality of the project solution.

2.2 Post completion review

Economic review

Due to the increasingly stringent feasibility process being adopted for projects, especially economic appraisal, an important strand of PCR is to evaluate whether the project met its economic or service predictions. This evaluation is critical if these predictive tools are to be properly developed.

Brief compliance review

An important aspect of PCR is to assess whether the completed project complied with its original brief, and, as a separate issue, whether the completed project meets the end user requirements. Examining these issues highlights how effectively translating the brief into reality has been. This component of PCR seeks to describe or to explain cause and effect relationships to enable project decision-makers to improve the quality of their future decisions.

Procurement/ Delivery process review

Agencies may wish to assess the effectiveness of the process used to deliver the project. This review examines the time and resources used to deliver the project and review matters such as the level of variations and disputes etc. It examines whether original time and cost targets were met and may include 'benchmarking' against accepted norms, or against other similar projects. Given the range of contractual systems employed it is worth gaining feedback on the merits of each contracting strategy employed. Interviews with key participants to determine the level of consultation are also suggested. (This review parallels Performance Reviews of consultants and building contractors).

This form of PCR essentially focuses on the concerns of the project manager, particularly, cost, time, decision-making and communication. This type of review has been consistently undertaken by Department of Public Works and Services.

Asset performance review

The traditional PCR concentrates on user feedback of the project performance. For buildings, this review would typically focus on physical planning issues and examine whether the range of spaces are appropriately sized, relationships between spaces are correct, the fit-out and engineering services are acceptable, etc.

Feedback on the durability, ease of use and maintenance of finishes and fittings is also appropriate. Comment from key staff, cleaning and maintenance staff and end users (school children, hospital patients, visitors or general public) should be sought.

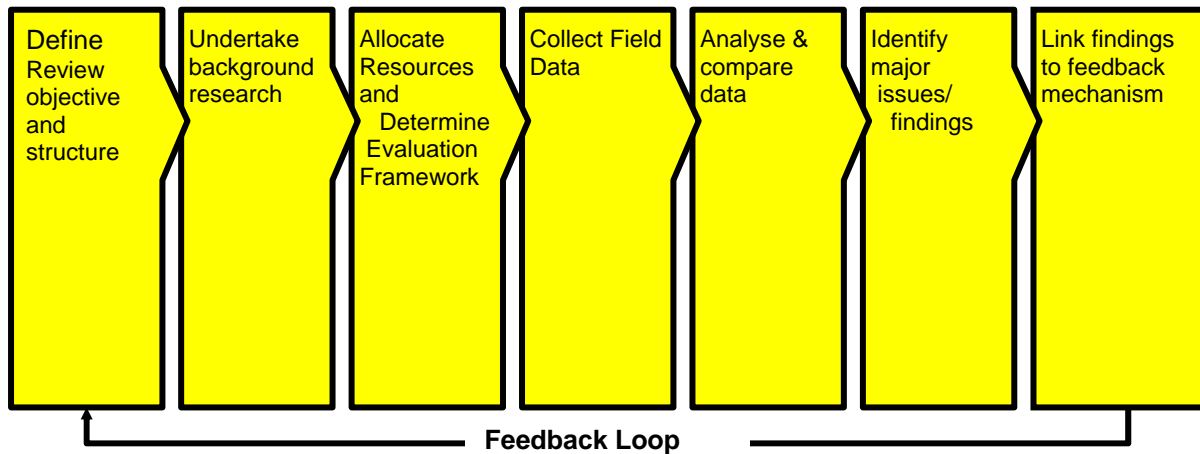
Such a review employs questionnaire, observation, walk-through and interviews as data collection techniques. (Refer to section 4 PIR Data Collection Techniques).

The NSW Health Department, The Department of Education and Training and The Department of Public Works and Services have undertaken a number of reviews of this kind in recent times. (Refer to section 3 Stage 2 for further sources of PIR information).

Technical review

A wide range of technical reviews may be undertaken, generally triggered by perceived consistent deficiencies, or a major technical change. A specialist team would conduct a review of procurement and operational issues, to identify good and bad practice. Such a review could include examination of defects records and maintenance activities. Specialist reviews of engineering services, typically air-conditioning, communications, hydraulics, Building Management Control System, etc, would be undertaken by the relevant disciplines. Appropriate specialists would similarly undertake detailed operational reviews.

3 Methodology

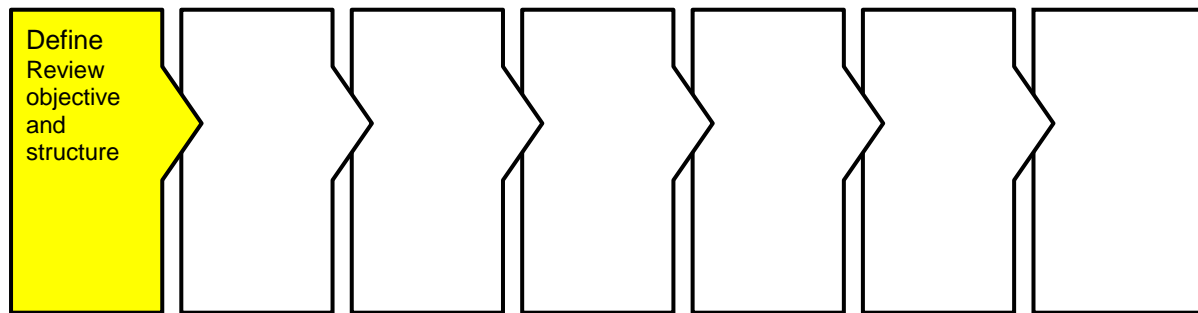


3.1 A generic process

The general methodology for PIR & PCR is based on a generic problem-solving strategy. This process is described in Appendix A “PIR planning and assessment checklist” and Appendix B “PCR planning and assessment checklist”

The process for performing both the PIR & PCR should generally follow the Planning Process shown in Figure 2.

Stage 1 Define review objectives and structure



Effective pre-planning and continuous monitoring of the PIR/PCR process is vital to avoid the inevitable 'explosion' of available information beyond the ability of the PIR/PCR team to evaluate. This stage is essential to optimise available resources and to specify intended objectives and required performance measures.

Initially the scope of the PIR/PCR including the needs of key stakeholders and major issues should be addressed. A program or agenda should be prepared to keep the process on schedule. This agenda should include:

- PIR/PCR objectives
- specific issues for investigation
- define a priority list
- define/select performance measures for comparison.
- A new PIR team's first task will be to clearly identify the:
- context and limits of the evaluation
- possible concerns of individual stakeholders
- resources available for the review and potential sources of data

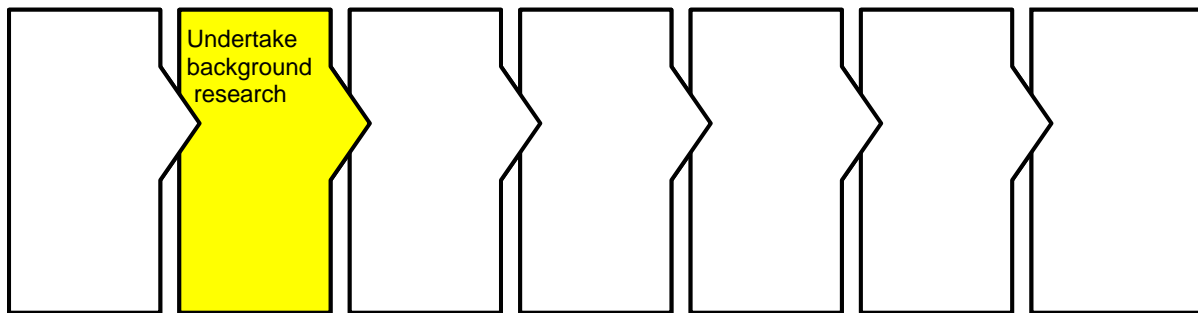
To successfully complete this first stage and define the PIR/PCR objectives, it is critical to:

- develop PIR/PCR objectives that are achievable within time and cost constraints
- describe PIR/PCR process and activities rather than outcomes to focus the team on effective implementation rather than end results.

Additional elements to be considered at this stage include individual agency corporate goals and objectives. The ongoing goal of best practice by NSW Government agencies together with community expectations will also impact at this stage. Focus attention on the type of feedback required and match this to data collection techniques selected. Include the fee, time frame and personnel required, including the facilitator and any specialist technical expertise.

Involving the original project team is often debated since there is a perception they may be defensive and biased. However the value of their experience relating to a project and the historical knowledge base they can bring to the process warrants their inclusion.

Stage 2 Background research



The smooth running of the PIR process will require the project team to undertake as much background research as is practical. However this research should be relevant to the specific PIR/PCR objectives.

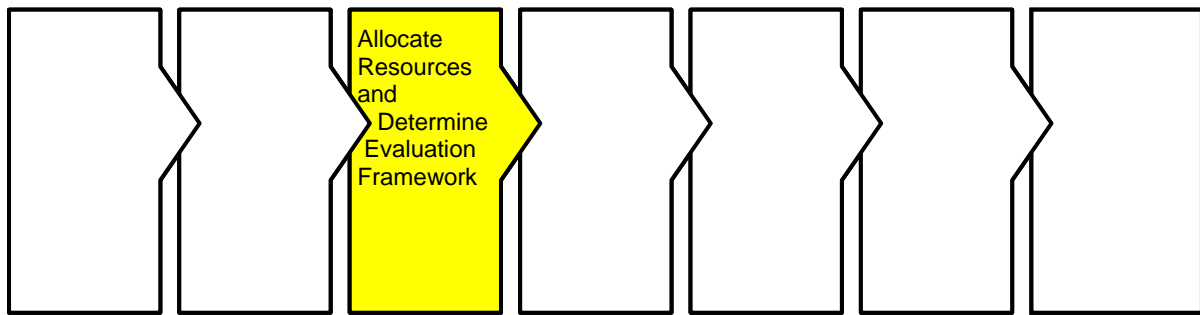
Available background material typically includes:

- Feasibility studies
- Value management reports
- Cost plans
- Contract documentation
- Progress reports
- Site minutes etc.

The pre-planning stage of the PIR/PCR should identify a specific timeframe for background research. Access to written documentation and individuals will need to be sourced from other agencies and from private consultants. The PIR/PCR team should consider this aspect in the pre-planning stage and attempt to make the maximum use of available material. They should become as familiar with the background of the project as possible. This will avoid unnecessary confusion in the data collection and subsequent phases of the review process.

The research stage will provide an opportunity for the PIR/PCR team to gain a broad grounding of the project procurement/ delivery process and associated relevant issues for the effective implementation of the evaluation process.

Stage 3 Allocate resources and determine evaluation framework



The resources and framework employed should be able to achieve the objectives of the PIR/PCR and generate suitable performance measures.

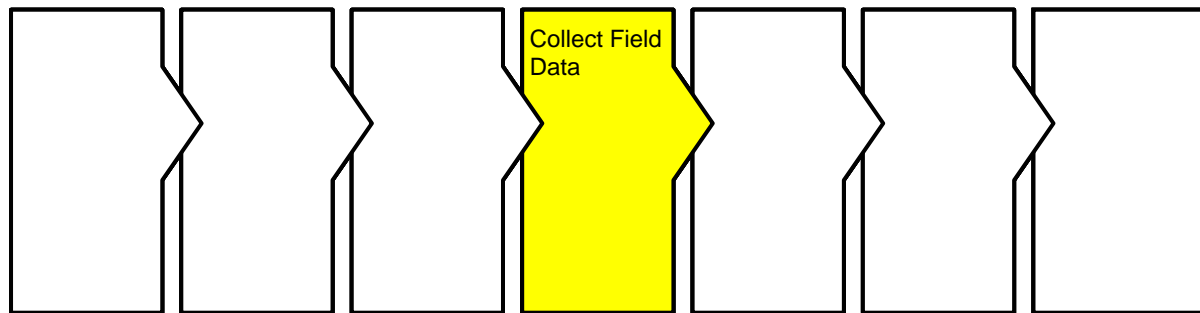
- Consider the PIR/PCR process objectives when evaluating:
- identifying specific information targets
- appropriate resources required
- the cost/benefit of achieving the identified information targets.

Interviews with key project stakeholders in the procurement/ delivery of the project will allow a greater understanding of the history, background and sensitivities of the project. Key project stakeholders would review the PIR/PCR process on an ongoing basis.

The end product of this stage is a framework or structure outlining the major process. The framework will describe the specific responsibilities, time frames and objectives of each major stage in the evaluation process.

To maximise benefit from the PIR/PCR, tailor the methodology to the characteristics of the particular project.

Stage 4 Data collection



Team members will be tempted to collect more data than required to achieve the set objectives. This temptation should be resisted, as it leads to:

- significant increases in cost, time and complexity with no real gain to the original objectives of the PIR/PCR
- a complex data collection process and respondents required may not give additional time to complete a survey or answer further questions.
- Specific data collection techniques include:
 - questionnaires
 - participant interview
 - expert walk through in the case of infrastructure or buildings
 - observation
 - 3 + 3 surveys
 - workshops
 - discussion

(Refer to section 4, Data Collection Techniques).

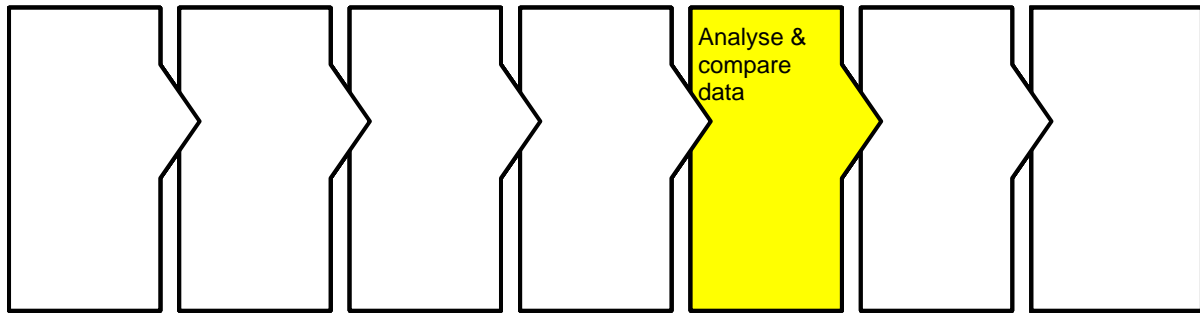
Select techniques primarily appropriate to the project rather than for logic or intellectual rigour. It is more desirable to gather timely data in an appropriate form at reasonable cost than to have the best possible information.

To minimise any pre-existing concerns of the various project stakeholders, planning of the data collection process should consider:

- how the evaluation team is to be introduced to the project stakeholders
- identifying, and notifying each stakeholder of the PIR/PCR process at its commencement and inviting their involvement in its development and implementation.
- limiting the number of group sessions used to collect data.

Whichever data collection techniques are used, ensure that information generated is in a form suitable for analysis and comparison, particularly performance measurement data, crucial to the success of a PIR and a PCR.

Stage 5 Analyse and compare data



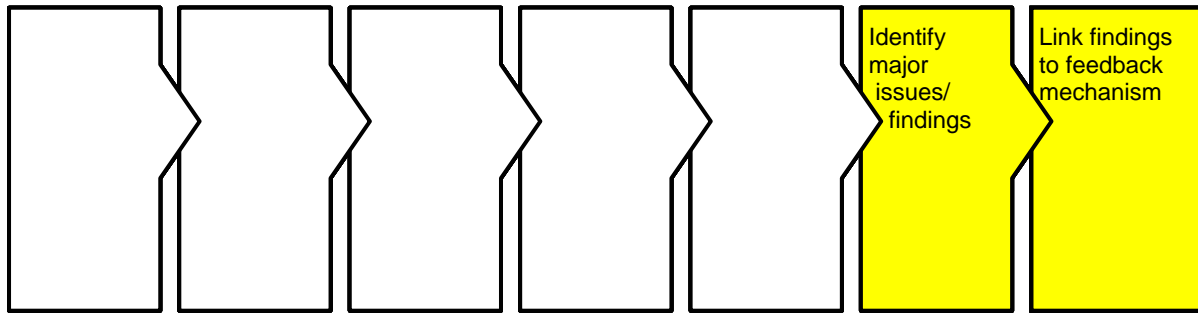
Analysis of survey results, preparation of the draft report for review by key personnel, and linking the findings to the evaluation objectives is the culmination of any PIR/PCR. This stage is the most critical, difficult and time-consuming stage of the evaluation.

- Success depends on:
- accurate translation of the data
- an effective data management system so the PIR/PCR team receives and manages new information
- coordination between agency employees and relevant consultants
- communication of the objectives of the study to the relevant consultants and project participants.

This stage is essentially built on the successful completion of all previous stages. The PIR/PCR team should be driven by the original objectives and evaluation plan to complete it. The most appropriate and effective format of the findings should be directly linked to the objectives of the evaluation and in a generic format that can readily be adapted across all project types.

A workshop to review draft results and obtain a collective view of the PIR/PCR process can provide an opportunity to review and reflect prior to the completion of the final document. Where survey results indicate a lack of data or inconclusive results it may be necessary to carry out additional primary research.

Stage 6&7 Major issues and findings/link to feedback mechanism



The PIR/PCR report is best prepared using the format of the data collection technique. The report should include findings of the study as well as recommendations and future actions.

The completed evaluation should be made available so the evaluation results can be acted upon and provide:

- valuable input into the ongoing updating and continuous improvement of the Agency's project strategy
- opportunity for ongoing refinement of the PIR/PCR process applied by individual agencies.

Items of specific interest to individual agencies may form the basis for articles in the Agency Newsletter.

The document is not regarded as public information and further distribution should be carefully considered.

(Refer to Section 5 - PIR Outcomes)

4 Data collection techniques

4.1 Generally

A range of techniques is available to conduct PIR/PCR. Most are based on social sciences approaches and, where more sophisticated exercises are required, the input of sociologists or psychologists could be considered.

Consider the following criteria in selecting the data-collection techniques for each PIR/PCR:

- appropriateness and validity to the project
- uniqueness
- completeness
- comprehensibility
- controllability
- cost
- timeliness of feedback
- accuracy and reliability

4.2 Questionnaire

The most commonly employed technique is the structured questionnaire. Involving a range of questions geared to measuring user responses to the required subject areas.

A major advantage of the questionnaire is that it allows the survey of a large sample of users and thereby improves statistical reliability.

Generally the best advice is “keep it simple”. There are many pitfalls with questionnaire design. Test pilot questionnaires before embarking on the cost of a major survey and consider how to analyse the questionnaires.

4.3 Participant interview

Structured, or loosely structured, interviews are an effective way of getting direct feedback from key staff/users. Interviews are hard to control and a flexible approach is suggested. A checklist of target issues is recommended. Output tends to be verbatim quotes.

4.4 Expert walk-through (infrastructure/ building projects)

This approach employs a team of “experts” to visit the facility and assess its performance by observation. A well selected team can extract a significant amount of information by observation. Some amazingly powerful indicators of design problems can include pedestrian desire-lines across lawns where paths have not been provided, ‘temporary’ signage replacing the designed signs, posters and notices covering ‘observation’ windows, corridors used for storage purposes, windows propped open for ventilation, broken door hardware, and offices or spaces accommodating more than their designed capacity. Construction detail issues can include leaking roofs, overflowing gutters, cracking brickwork, excessive heat gain, defective door hardware and leaking taps.

Combine observation with interviews to check that the identified problems are correctly diagnosed. Allow users to participate in the “walk-through”. Identifying these “problems” raises whether the cause was briefing, construction, supervision or user initiated.

4.5 Observation

Where user behaviour patterns are a major concern non-participant observation may be appropriate. Typical examples from road design would be a traffic count. Buildings with large pedestrian movements could undertake pedestrian counts. Simple devices like time-lapse movies could be considered. Often attending the site at critical times can provide insight into these issues. Obtain historical records of service outputs, number of patients, and customer complaints.

4.6 3 + 3 Survey

A very simple technique for gaining quick responses is the “3 + 3” questionnaire, which asks users to list three positive aspects and three negative aspects of the project. This technique gives equal weight to positive features as it is often easier to focus on negative issues rather than positive ones.

4.7 Workshop

The techniques of Value Management can be applied to PCR. Organise a structured workshop with key participants to gather user responses. This approach has the advantage of being a focussed, short duration technique.

4.8 Discussion

Unlike sociological or market surveys PCRs have a very small sample size. There may only be one CEO responsible for a service delivery strategy, one Principal of a primary school or one Nurse Unit Manager of the Emergency Department. In these instances the PCR team need to judge the validity of the data and the complex, conflicting issues of personality, organisation, morale, and physical environment. Translating the survey results requires the input of experienced personnel.

A larger number of over-view surveys are preferable to limited in-depth studies that may be skewed by specific project conditions. Unlike scientific experiments it is rarely possible to isolate **any** of the variables.

5 PIR/PCR outcomes

5.1 PIR results

Data generated and analysed from a PIR will impact on briefing, design and procurement or delivery. Ideally, PIR results should be translated into briefing or specification requirements. Such requirements can be endorsed by the agency and incorporated into future project briefing or standard design guides, especially where the same organisation has responsibility for the whole process.

5.2 Implementing feedback

The objective of any feedback system should be to link the findings back to the right people, at the right time and in the right format, for easy application and understanding to each new project.

The PIR process may identify deficiencies, for example layout problems, which are causing distress at the user level. Ideally these problems should be eliminated by alterations, if required. Problems generated by lack of user awareness, or inappropriate delivery/operational practices, may require some form of awareness raising or retraining.

5.3 Information bank

Feedback gained across a range of studies should be accessible to the widest audience, allowing comparison of results across projects. Architects designing a new operating theatre could access results from PCRs of recently completed theatres. A service delivery planner could access feedback on call centres established by other agencies. This approach would overcome some statistical validity issues discussed earlier since it would provide a larger sample.

During the late 1980's both the Schools Building Research and Development Group of the then NSW Department of Public Works and the former Commonwealth Department of Housing and Construction, developed computerised data-bases for retrieval and sorting of results (Reference #5). Both systems employed categorisation systems, by both user-defined functions, eg. building department, and by technical or building function, planning, relationships, engineering services, acoustics, thermal comfort, etc. Such a categorisation allowed flexible retrieval and sorting as outlined in figure 3.

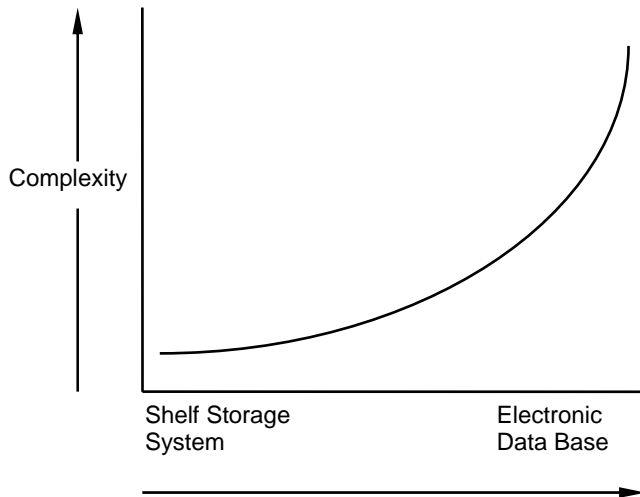
Figure 3 Classification system

SERVICE ISSUES	PLANNING UNIT	TECHNICAL ISSUES
(School) Student/Staff Issues Growth/Expansion Technology Change Learning Techniques	(School) Administration Staff Facilities Relationships Learning Areas Library Communal Areas Support	(School) Space Requirements Architectural Acoustics Comfort Conditions Openings Security Finishes Services Communication Furniture/Fixtures

This approach success relies heavily on suitable classification of survey data. Adopting a standard classification system across the building industry would ideally allow for more effective sharing of feedback. If this could be attained then a 'collective' feedback system would be achievable.

An agency can apply a wide spectrum of feedback retrieval systems to manage information generated from a PIR program. The spectrum is graphically described in the following figure 4.

Figure 4 Feedback spectrum



The issues arising from the storage, retrieval and administration of PIR/PCR results reflects a general condition affecting the whole asset creation industry. Earlier approaches like the Sfb (Building Component Index) system are largely discontinued. Attempts by the former National Public Works Committee (now the Australian Procurement and Construction Council) to establish standard nomenclature have been beneficial. The National Committee for Rationalised Building (NCRB) has also invested efforts into the development of an industry-wide information system and have produced glossaries of terminology and conceptual models as a first step. (Reference #5 & #10).

5.4 External standards

Where feedback indicates inappropriate external standards (Australian Standards, Building Codes, etc), recommendations can be made to the relevant agencies. This is a more substantial undertaking and reflects the real difficulties of building a more responsive feedback process.

The credibility of the PIR/PCR process rests on the way survey results are handled. Producing another report to sit on the shelf is not satisfactory. Organisations need to accept responsibility for the feedback achieved and respond appropriately.

Appendix A PIR planning and assessment checklist

A1 Service level requirements

- Where are project objectives defined and service requirements?
- Did the completed project align with the project service objectives?
- Did the project meet service needs upon completion?
- Was an Economic appraisal done? (Required for all projects costing >\$500,000)

A2 Project planning

- Was a Value Management Study done? (Required for all projects costing >\$1,000,000).
- Was a Risk Analysis done?
- Was Private Sector Participation considered? (Required for all Projects costing >\$5 Million).

A3 Project outcomes

Consideration of the project outcomes will include the following questions:

- Have the desired benefits as expected in the EA/VMS accrued?
- Have the Client's needs been met?
- What are the customer effects?
- What are the environmental effects?
- Was the Scope of Works delivered to the required technical standard?
- Was the project completed on time?
- Was the project completed within budget?

Appendix B PCR planning and assessment checklist

B1 Brief assessment

- Was the scope of Works fully detailed?
- Project total cost known to within acceptable order of accuracy?
- Implementation Plan available?
- Environmental impacts adequately assessed?

B2 Design performance

- Was the Tender and Procurement Process followed properly?

B3 Project approvals

- Was the Project Approval process followed and the necessary approvals obtained?

B4 Construction/ delivery process control

- Was a Project Management Plan compiled?
- Was this Project Management Plan monitored against targets set, that is, cost and physical progress?
- Where the actual performance deviated from Plan were corrective actions taken? These actions include necessary officers informed and adjustments made to the Plan.

Appendix C PIR reporting format

The following format should be used.

Project summary sheet/executive summary

The project Summary Sheet is attached to the completed report and contains basic project data such as project title, asset location, project manager's name, client name and position, together with a brief description of the procurement process covering time, cost and completion.

Contents

- 1 Executive summary
 - 1.1 Overall assessment
 - 1.2 Lessons learned
 - 1.3 Follow-up actions

- 2 Background
 - 2.1 Project background and objectives
 - 2.2 Scope, terms of reference, direction and project team

- 3 Project efficiency
 - 3.1 Evaluation objectives to be achieved
 - 3.2 Criteria to be meet
 - 3.3 Project costs (planned vs actual)

- 4 Project approval and management.
 - 4.1 Approvals
 - 4.2 Procurement
 - 4.3 Handover/completion

- 5 Operational performance

- 6 Performance assessment and measurement

- 7 Overview and observations

- 8 Recommendations and conclusion

Appendices

- A User survey results
- B Other additional information as may be appropriate