

Use of ADP in the  
Commonwealth Public  
Sector—The MANDATA  
Project

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Report

**175**

Joint Committee of  
Public Accounts

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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

JOINT COMMITTEE OF PUBLIC ACCOUNTS

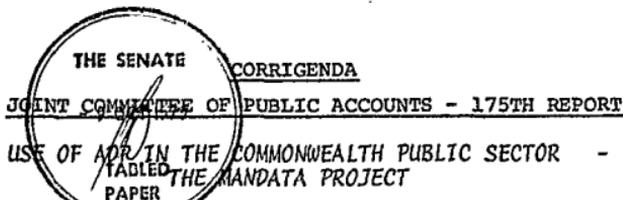
ONE HUNDRED AND SEVENTY-FIFTH REPORT

USE OF ADP IN THE COMMONWEALTH PUBLIC SECTOR-  
THE MANDATA PROJECT

Australian Government Publishing Service  
CANBERRA 1979



THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA



- Page 2: Paragraph 1.5, Line 2, 'exist in the sphere' should read 'exist outside the sphere'.
- Page 5: Paragraph 1.21, Line 1, 'relevant' should read 'relative'.
- Page 6: Footnote \*, Line 2, 'Chapter 2' should read 'Chapter 3'.
- Page 17: Paragraph 2.37, Last line, add footnote reference '39'.
- Page 31: Paragraph 4.3, Line 2, '1977' should read '1978'.
- Page 42: Paragraph 4.44, Last line, add 'that the' to end of line.

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The *House of Representatives* appointed its members on 1 March 1978  
and the *Senate* appointed its members on 22 February 1978.

- (1) Appointed (*ex-officio*) 14.3.78
- (2) Appointed 28.9.78
- (3) Appointed 18.10.78
- (4) Appointed 17.8.78

The following members were discharged from the Committee on the dates  
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J.J. Brown, M.P., 18.10.78  
S.A. Lusher, M.P., 28.9.78  
Senator M.A. Colston, 17.8.78  
Senator A.J. Messner, 17.8.78

DUTIES OF THE COMMITTEE

Section 8 of the Public Accounts Committee Act 1951 reads as follows:

8. The duties of the Committee are -
- (a) to examine the accounts of the receipts and expenditure of the Commonwealth and each statement and report transmitted to the Houses of the Parliament by the Auditor-General in pursuance of subsection (1) of section fifty-three of the Audit Act 1901;
  - (b) to report to both Houses of the Parliament, with such comment as it thinks fit, any items or matters in those accounts, statements and reports, or any circumstances connected with them, to which the Committee is of the opinion that the attention of the Parliament should be directed;
  - (c) to report to both Houses of the Parliament any alteration which the Committee thinks desirable in the form of the public accounts or in the method of keeping them or in the mode of receipt, control, issue or payment of public moneys; and
  - (d) to inquire into any question in connexion with the public accounts which is referred to it by either House of the Parliament, and to report to that House upon that question,

and include such other duties as are assigned to the Committee by Joint Standing Orders approved by both Houses of the Parliament.

PREFACE

This report is the second in a series on the use of ADP in the public sector. The first dealt with the acquisition of large-scale systems in the Public Service.<sup>39</sup> In it we pointed out the high cost that can result - and has frequently resulted - from unduly prolonging the procurement process. We also drew attention to the fact that the present method of tendering often does not result in suppliers offering their best solutions to a department's data processing problem. We made a number of recommendations to improve these and other aspects of the overall acquisition process.

The present report is essentially a case study of the origin, acquisition and development of one major Public Service system - MANDATA.

Many of the principles discussed in the previous report, particularly, those relating to the importance of senior management involvement, are well illustrated in MANDATA's development and are dealt with in more detail in this report.

The third report in this series will cover efficiency and effectiveness of installed systems, with particular attention to methods of setting objectives and measuring and controlling system performance and effectiveness.

The Committee wishes to acknowledge the outstanding contribution of its technical adviser, Mr Peter Macgregor of P.K. Macgregor and Associates, and the Secretary and Staff to the Committee in the preparation of this report.

For and on behalf of the Committee.

M.J. Talberg,  
Secretary,  
Joint Committee of Public Accounts,  
Parliament House,  
CANBERRA

David M. Connolly, M.P.  
Chairman

25 September 1979

39. Joint Committee of Public Accounts 174th Report, Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service, Canberra 1978, Parliamentary Paper No. 341/1978.

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## CHAPTER 1

### INTRODUCTION

1.1 MANDATA is a computer-based personnel and establishment system being developed by the Commonwealth Public Service Board (called "the Board" in this report) to assist in administration of personnel covered by the Public Service Act and some other statutes.

1.2 In its 1971 Annual Report, the Board described MANDATA as:

...a centralised Service-wide computer based personnel and establishment system with direct links to the payroll and superannuation systems, that would provide a response to enquiries as effective as existing systems while providing a superior management information system.

1.3 The proposed system is large and complex: to May 1979 it had cost approximately \$19 million. Because the project is still in the development stage, benefits up until now have been small. By 1986/87 MANDATA will have cost more than \$45 million for equipment, development and operation. Over the same period the Board expects that the Public Service will have achieved savings due to MANDATA of over \$64 million in reduced clerical costs and other direct savings, and at least \$35 million more through improved manpower resource management.\*

1.4 Numerous cost/benefit estimates have been made for MANDATA - initially to help decide whether to undertake the project, and later to assess whether it should be completed. In all of these, including the review by this Committee, costs have been taken as those of the equipment and software, the personnel, and the services and supplies that will be needed to develop and operate the system. Benefits have been assessed as the cost reductions that will result from the targeted 'staff savings' due to MANDATA by 1982/83.

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\* Estimates<sup>51 52</sup> based on direct salaries, not including overheads expressed in June 1977 dollars. June 1977 has been selected as the common time base to allow comparison of estimates made at different times. See Chapter 4 for details.

51. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 25 June 1979.

52. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 18 July 1979.

1.5 In the estimates presented to us, the Public Service Board has not taken into account the costs or savings that exist in the sphere of efficiency and productivity of the service. If the estimated staff reductions which were used to justify the project are actually made, there will probably be a significant impact on unemployment. On the other hand if the staff reductions are not made but instead people are redeployed within the Service, the then 'benefit' of MANDATA is not a reduction in the cost but an increase in the capacity of the Public Service.

1.6 The options open therefore lie between the extremes of reducing the size of the Public Service, with savings of the order of \$100 million by 1986/87 or redeploying the staff within the Service and foregoing the monetary saving. The Committee is concerned that the Public Service Board has not fully faced the prospective changes to the workforce that may result from technological change. The Government should formulate guidance for the Public Service Board on acceptable objectives and Parliament should be informed of these.

1.7 MANDATA is an example of a situation which will become increasingly common in an era of high technology; uncertainty as to the responsibilities of non-technical policy makers (in this case the Commissioners of the Public Service Board and the heads of user departments) in initiating and directing complex technical projects.

1.8 The MANDATA project has run a bumpy course. It has been the subject of review by the Government, critical comment by the Auditor-General, criticism in Parliament by this Committee, and adverse Press comment. The question therefore arises as to whether development of MANDATA should continue. In 1977 P.A. Consulting Services Pty Ltd said:

We consider that the program as planned and estimated represents a reasonable investment, with sound objectives. On the basis that it will be well managed, and that strong commitment at high levels in the Public Service is obtained and maintained, then the program should proceed.

1.9 With the qualification that project objectives require better definition and the additional proviso that the recommendations of this report are implemented, the Committee agrees with the above view.

1.10 However, the Committee is of the opinion that the project for much of its life has been poorly planned and directed and that some aspects of its management are still very unsatisfactory. This is of particular concern because, while the Board believes that it has a charter to co-ordinate and control ADP development within the Service, it has demonstrated less than adequate competence in planning and managing its own major ADP project.

4. P.A. Consulting Services Pty Ltd, Review of MANDATA, June/July 1977.

1.11 Any consideration that is given in future to extending the powers or responsibilities of the Board for ADP co-ordination should take into account the Board's handling of MANDATA. Until the Board conclusively demonstrates a greatly improved capacity to manage ADP development we believe it would be unwise to extend its power to control other departments' projects. The Board should instead concentrate on completing the MANDATA project in an efficient and effective manner and on improving its ability to assist departments who need help in ADP development.

#### REASONS FOR INVESTIGATING MANDATA

1.12 The terms of reference of the Committee's ADP inquiry are:

1. To investigate computing matters raised by the Auditor-General in his Report for the year ending 30 June 1976, and earlier reports.
2. In relation to computing in the Commonwealth Public sector:
  - (a) Inquire into the procedures adopted to identify needs for computing equipment.
  - (b) Inquire into the procedures in use to procure computing equipment.
  - (c) Ascertain in selected cases the utilization and effectiveness of installed computing equipment.

1.13 An investigation of MANDATA is relevant to the Committee's purpose on at least three counts:

1. Aspects of MANDATA have received unfavourable comments by the Auditor-General in his reports for 1975/76, 1976/77 and 1977/78.
2. The project has experienced delays, cost increases, changes in development strategy, and changes in product specification. The Committee wished to ascertain whether these were due to mismanagement and whether they represented a significant waste of public funds.
3. In pursuing Part 2 of the terms of reference of its ADP inquiry the Committee was interested in several aspects of the development of large Government computer systems in general. MANDATA provided a convenient case-study on which to base an examination of the following questions:
  - a) Did the concept of the project arise from a genuine user need, or was it principally a technical development which then sought users?

- b) Were managers of user departments involved sufficiently at all stages?
- c) Was the Public Service Board management sufficiently involved at all stages?
- d) What contribution was made by the Inter-departmental Committee on ADP?
- e) Has the development of the system been effectively managed?
- f) How confident can we be that MANDATA will meet its original goals?

1.14 This is not a technical review of the proposed systems. It is an analysis, from a general management viewpoint, of evidence obtained at and as a result of public and *in-camera* hearings and from written responses to questions. Consequently it cannot achieve the level of detail of recommendations that would result from an on-site system review by the Committee's specialist staff.

1.15 Although this report is far from being an exhaustive analysis of MANDATA, we believe the topics covered to be significant. Further important questions can only be answered after the project has progressed. The Committee therefore intends to review progress periodically until the project is complete, which is scheduled for mid 1981.

1.16 The Committee had considerable difficulty and experienced inordinate delays in obtaining appropriate documentation about MANDATA from the Public Service Board. We were given stock explanations for non-production - the material requested:

- (i) was used in the preparation of Cabinet documents,
- (ii) were Cabinet documents,
- (iii) were used in the preparation of interdepartmental reports, or
- (iv) were such reports.

1.17 The Committee is strongly of the view that witnesses should not be able to use the screen of alleging privilege status for these documents to escape scrutiny.

1.18 The Westminster concept of ministerial responsibility evolved at a time when government operations were much more simple and it was possible for a diligent minister to comprehend the full range of activities of his department and take full responsibility. The vast increases in complexity, sophistication and the increase in the volume of work in the last decades have put the Westminster tradition under severe stress.

1.19 This makes the need for scrutiny by parliamentary bodies such as the Public Accounts Committee even more important and reduces the justification for failure to provide relevant information under the excuse of privilege where documents relating to Cabinet submissions or other interdepartmental activities are denied. We do not accept that a general embargo should be placed on the access to all material needed in the preparation of Cabinet submissions. An extension of this principle would make the work of this Committee - or even the Parliament - impossible.

#### Avoidable Costs

1.20 While it is always possible with hindsight to point to errors which should have been avoided even in well-managed computer projects, the Committee considers that significant costs have occurred on MANDATA which should not have occurred if system development had been planned and managed in accordance with the best current practice.

1.21 Cost increases relevant to estimates have resulted from, among other things:

- Delays in reaching project milestones due to lack of resources and the inefficient application of those resources.
- Premature acquisition of data-concentrator-units and minicomputer units.
- Unproductive site planning effort.
- Unproductive system development effort.

1.22 These factors account for several million dollars in direct and indirect costs, of which a minimum level of unnecessary costs of \$1.2 million can be identified resulting from premature acquisition of minicomputers and data-concentrator-units, and unproductive site-planning effort. (See Pp 61-70 and 82-87).

CHAPTER 2

SUMMARY OF ISSUES AND RECOMMENDATIONS

A BRIEF DESCRIPTION OF MANDATA

Purpose

2.1 MANDATA is a computer-based system to aid in personnel and establishment administration.\* The Public Service Board stated that its purpose is to:

- a) increase the efficiency of administration of personnel and establishments within all departments of the Service by automating the routine record-keeping activities and the bulk of non-discretionary rules associated with these administrative areas;
- b) improve manpower planning and management within the Public Service by providing a wide range of management statistics and other information about staff, organization, procedures, Government programs, conditions and salaries;
- c) provide improved service to Public Service staff by putting changes in pay and allowances into effect more promptly.

2.2 MANDATA is intended to result in:

- a) a significant reduction in the staff of personnel/ establishment units, with consequent cost savings;
- b) more consistent application of Public Service rules;

---

\* Additional details of the origin and development of MANDATA will be found in Chapter 2 and in Appendix 3.

4. P.A. Consulting Services Pty Ltd., *Review of MANDATA*, June/July 1977.
13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

- c) greater accuracy of salary and superannuation payments to staff;
- d) increased privacy of personnel records from unauthorised access;
- e) an overall reduction in Public Service staff through the more efficient use of human resources, with consequent cost savings.<sup>2,3</sup>

How MANDATA will be Used

2.3 Records containing personal, salary, and Service history details of Public Service staff are stored on magnetic media on a large-scale central computer in Canberra, operated by the Board. When the system has been fully implemented, it will contain such records for over 150,000 staff. In addition to personal details, the system will store records of Public Service positions and organization structure.

2.4 Recorded information will be accessible for viewing by authorised officers. Managers will be able to view details of individual staff, positions or organisations, and in addition will receive reports - some regularly and others on demand - to assist them in the administration of personnel and establishments within their departments. Authorised officers will be able, on request, to obtain a wide range of statistics and forecasted trends about personnel and positions.

2.5 According to the Board, comprehensive privacy procedures will ensure that only authorised officers can initiate inquiry or update transactions, and access by these officers will be restricted to parts of the data which they have legitimate 'need to know' or right to update.

2.6 Extensive sets of computer programs will carry out the calculation of leave entitlement and gross pay and allowances. Such programs must of course embody the complex rules governing the administration of personnel and compensation within the Service.

2.7 During 1980 steps will be taken to provide automatic data interchange with the Department of Finance payroll and the Australian Government Retirement Benefits Office. Gross pay details will be transmitted from the MANDATA computer to the Department of Finance computer to permit the calculations of salary entitlements.

2.8 The above functions of the system fall into four major categories:

- 
2. Public Service Board, *MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System*, November 1971.
  3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.

- a) the storage and maintenance of records of personnel and establishments;
- b) the provision of an information service to management;
- c) the calculation of entitlements to leave and compensation;
- d) the linkage of the personnel and establishment system with the Department of Finance payroll system.

2.9 It is anticipated that the use of a computer system rather than manual methods to perform these functions will result in the following advantages:

- a) The huge task of maintaining Public Service personnel and establishment records can be performed more accurately and at less cost by computer than by clerical staff using manual methods.
- b) Information which is held in records on the computer - or which can be derived from such records by calculation - will be available quickly to Public Service managers to assist them in personnel management tasks. Manual procedures for delivering this kind of information to management are less accurate, slower and more costly than computer methods.
- c) The complex calculations of leave entitlement and gross pay and allowances, which with past manual methods have been prone to error and the inconsistent application of Public Service rules, will be carried out more quickly, more accurately, more consistently and at less cost than with manual methods.

#### PRINCIPAL ISSUES INVESTIGATED

2.10 The study of MANDATA covered three major areas:

- . Matters raised in reports by the Auditor-General.
- . Costs and benefits.
- . Public Service management.

2.11 The Committee examined the aspects of MANDATA raised by the Auditor-General in his reports for 1975/76, 1976/77 and 1977/78. These matters are symptoms of more fundamental problems arising from the way MANDATA has been managed since it was conceived some

ten years ago. The main part of this report therefore deals with the lessons which can be learned from MANDATA about managing large ADP projects. Our analysis of matters raised in the Auditor-General's reports will be found in Chapter 6.

#### SUMMARY AND RECOMMENDATIONS

2.12 Asterisks in front of recommendations indicate the additional degree of importance which the Committee attaches to them, thus:

- \*\* Critically important.
- \* Very important.

#### General

- . The MANDATA project should be completed as quickly as possible.
- . Decisions must be made about the precise form that the hoped for benefits of MANDATA will take - whether it is to be reduction in staff in the Public Service or their redeployment. The Government should state the policy on which such decisions will be based.
- . Once these decisions have been made, a commitment should be made by Heads of departments and the Board to achieve specific measurable benefits from MANDATA. Training to improve skills in human resource management is necessary if estimated monetary benefits are to be achieved.
- . Improvements are required in the documentation of the MANDATA project regarding
  - objectives
  - functions
  - design characteristics and quality-of-service levels
  - time schedules for development
  - manpower requirements
  - cost to complete
- . Continuing surveillance is required by Heads of user departments and the Board of the objectives and performance of the system being produced, to ensure that savings for which commitments have been made can still be achieved.

Management Control (See Ch. 4, pp 31-35)

2.13 The Committee has been unable to discover a single comprehensive document which sets out the present objectives for MANDATA or the characteristics it should have to meet these objectives. Such a document, if properly used, would improve planning and control of the project, and communication with users, the Board management and review bodies outside the Board. It could provide an additional tool for holding the MANDATA project team accountable for performance. To ensure that such a document is firmly founded it is essential that the Board Commissioners first confirm the objectives of MANDATA.

2.14 Therefore:

- \*\* (1) *The Commissioners of the Public Service Board should issue a comprehensive statement of the objectives for MANDATA to provide a fundamental basis for planning and control.*
- \*\* (2) *A comprehensive requirements specification should be prepared promptly by the MANDATA Program Office in consultation with major users. This document should set out the objectives for the system as determined by the Commissioners, and the characteristics necessary to meet those objectives, including:*
- . *definitions of inputs, processing and output*
  - . *security and privacy provisions*
  - . *reliability goals*
  - . *maintainability and restartability features*
  - . *user-interface performance goals.*

2.15 The responsibility for ensuring that service levels and other goals are met and that MANDATA development proceeds in an efficient and economical manner must rest ultimately with the Commissioners of the Board themselves.

2.16 Therefore:

- \*\* (3) *The requirements specification should be agreed to by the Commissioners of the Board and used by them in reviewing progress against goals.*
- \*\* (4) *The Commissioners should continue to review carefully project progress and cost, and product quality, and to ensure optimum resource allocation to the project. If costs significantly exceed estimates, or benefits fall below estimates, or product quality does not meet the goals set for it, corrective action should be taken.*

\*\* (5) *The Commissioners should ensure that a comprehensive policy is published which states what kinds of information in MANDATA are restricted as regards access, and who is entitled to have access to each kind of restricted information.*

\*\* (6) *The Commissioners should satisfy themselves that effective controls exist in design and operation of MANDATA to ensure that only authorised officers may have access to any information, and then only to those parts of the information which they are specifically entitled to view or change.*

\*\* (7) *The Board as the appropriate authority should set quantified objectives for quality-of-service levels to be provided by the MANDATA system and should communicate these to users. Actual service levels achieved in operation should be measured and the results reported to users.*

2.17 MANDATA is anticipated to have a significant effect on organization, staffing and duties within the personnel and establishment sections of the Board and user departments. It can also be expected to have a significant effect on staff levels and/or duties across the Public Service generally. The timetable for the achievement of cost savings which MANDATA is hoped to bring about requires that these changes in the Service take place between 1979 and 1983.

2.18 The Government should advise Parliament about the options that this presents for re-organization and reduction of the Public Service and the consequent impact on the personnel involved.

2.19 Unless these matters are considered promptly and decisions taken, achievable cost reductions may be diminished and unnecessary dislocation may result for those whose jobs will be affected.

Therefore:

\*\* (8) *The Commissioners of the Board and Permanent Heads of user departments should ensure that detailed plans are formulated promptly to bring about the changes in organisation structure, the redefinition of duties, the redeployment of people and the changes in numbers of staff that will be necessary to ensure that planned cost savings are realised within the planned time-frame.*

\*\* (9) *The Commissioners and Permanent Heads should publicly and immediately make quite explicit what impact they expect or intend MANDATA to have on staffing levels, organisation and duties.*

2.7 Commitment to Achieving Savings  
(See Ch. 4, pp 35-41 & Ch. 5, pp 54-57)

2.21 Potentially the MANDATA system can assist in the more effective utilization and development of human resources within the Service, and/or by the reduction in the size of the Service and a consequent increase in productivity. The achievement of maximum savings requires both full commitment by departments to achieving them and adequate competence in the techniques of manpower planning.

2.22 Therefore:

\*\* (10) *The Public Service Board should without delay prepare up-to-date detailed estimates of the expected savings and other benefits from MANDATA.*

\*\* (11) *Quantified objectives should be set within departments for the achievement within specified times of management benefits resulting from the use of MANDATA. Department Heads should formally acknowledge them to be worthwhile and should undertake to achieve them. Performance in the achievement of the objectives should be measured. If the aggregate dollar value of the objectives differs from the estimates of benefits contained in Chapter 5 of this report, Parliament should be informed of the extent of the difference and the reason for it.*

\*\* (12) *To help managers achieve the designated management benefits of MANDATA, training appropriate to present skills levels and future duties in human resource management should be given to all managers in user departments and in the Board with particular reference to the use of the new system.*

2.23 Since the achievement of a large part of the potential benefits from MANDATA rests with the managers of user departments, Permanent Heads should regularly review the product that is being developed to satisfy themselves that it will enable them to meet staff reduction, productivity improvement and other goals which they have set for themselves.

2.24 Therefore:

\*\* (13) *The Board together with Permanent Heads of the major user departments should form a Project Board of Management, meeting quarterly, to review the product and satisfy themselves that it will enable them to achieve their goals within the planned timetable. If not, appropriate corrective action should be initiated.*

Contributions of the Interdepartmental Committee on ADP  
(See Ch. 4, pp 41-44)

2.25 The Committee believes that the Board, in the initial planning and development of MANDATA, underestimated the difficulty of carrying out the project and overestimated its own abilities in the sphere of system development. This is demonstrated by the numerous errors described in this report, which the Board has made in the course of design, procurement and development.

2.26 The Interdepartmental Committee on ADP when considering the Board's proposals for MANDATA apparently did not bring this fact to the Board's attention. In our opinion it should have done so. We recommend that:

\*\* (14) *When reviewing a department's proposal for a development project, the technical IDC should ensure that consideration has been given to the experience and number of personnel required to carry out such a task, whether the department has the resources, and if necessary, how the department's resources might be supplemented.*

Project Planning, Reporting and Control  
(See Ch. 4, pp 44-49)

2.27 Planning, reporting and control of some aspects of the MANDATA project are unsatisfactory.

\*\* (15) *The Board should increase its use on this project of formal system development and project management techniques particularly in areas of documentation for management review and control.*

\*\* (16) *The Board should evaluate urgently available proprietary system development methodologies for use on the remainder of MANDATA development and on other projects.*

Use of External Resources (See Ch. 4, pp 44-49)

2.28 The Public Service appears to experience difficulty in attracting and retaining fully qualified personnel for large-scale system software development and for programming project management. As a number of commercial firms can provide such skills on contract we believe that as a general rule the Public Service should contract with qualified software suppliers for major special software development rather than undertake it within the Service.

2.29 The Committee recommends that:

- ^(17) Department Heads should be aware of the many highly specialised aspects of system development, and the problems in recruiting and retaining fully qualified personnel. Careful consideration should be given to contracting the development project to a qualified commercial organisation, or if the development is to be done within the department, to obtaining specialist skills on contract to supplement or manage departmental staff.*
- \*\*^(18) If it is necessary to develop a major system with departmental resources a proven formal system development methodology should be used.*
- ^(19) Application packages and system programs should only be developed within the service if it can be shown that this approach is more cost-effective than obtaining (and possibly modifying) commercially available programs.*

Cost/Effectiveness Analysis (See Ch. 5, pp 57-60)

2.30 The guidelines for cost/effectiveness analysis of computer projects published by the Board should be expanded in several respects and also be supplemented by similar guidelines for measuring the effectiveness and efficiency of installed systems.<sup>20</sup> We recommend that:

- ^(20) The Public Service Board should give consideration to extending its guidelines for determining the economics of computer system proposals to include methods for the assessment of:
  - . risk
  - . impact on other projects
  - . capacity and capability of the department to carry out the project.*
- ^(21) The Board should supplement its guidelines on cost-effectiveness analysis with similar guidelines on the assessment of the effectiveness of computer systems in operation.*
- \*\*^(22) The Board or the Department of Finance should prepare and publish guidelines to assist Permanent Heads in the rational and consistent analysis of benefits and costs of proposed large-scale computer projects (eg for presentation to Ministers), taking into account:*

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20. Public Service Board, *A Guide to Cost-effectiveness Analysis of ADP Systems* (ADP Information Manual No..2), Canberra 1978.

- *the extent to which the project contributes to the policy of the Government of the day.*
- *the costs and benefits, social and otherwise, of the project.*
- *the impact on alternative projects.*
- *the impact on personnel and organisations within the Public Service.*

2.31 While endorsing the goal of increased productivity and effectiveness in the Public Service through the use of computers, the Committee considers that possible side effects such as unemployment cannot be ignored.

2.32 The Board's recently published 'Guide to Cost-effectiveness Analysis of ADP Projects' does not take into account any possible unemployment effects associated with staff savings following the introduction of a computer; nor have such possible effects been considered in the cost and benefit analyses of the MANDATA project. This approach was acceptable in an earlier period of full employment but it is not so today. The Committee is of the opinion that Cabinet, when it is considering a proposal for a large computer project, should take into account social and Service-wide ramifications of the project.

2.33 We recommend that:

- \*\*^(23) Submissions to Cabinet on large computer projects should make clear all the expected or planned effects including:
  - . staff redeployment
  - . effect on size of the Public Service
  - . effect on unemployment levels
  - . retraining costs
  - . other significant effects not accounted for in the acquiring department's cost effectiveness analysis.*

Planning Accommodation and Site Services (See Ch. 6, pp 61-70)

2.34 For some computer systems an auxiliary power source such as a battery bank or standby generator is needed to maintain an uninterrupted power supply where continuity of computer operation is critical.

2.35 In the case of MANDATA the construction authorities were not notified that an uninterrupted power supply was considered to be necessary until well after site planning had started. When the decision was made that both standby generator and batteries were needed the already considerable confusion over site requirements was exacerbated. Subsequently it was decided that neither standby generator nor batteries were needed. To avoid this situation on other projects, the Committee recommends that:

*\*(24) The question of whether uninterrupted power supply is required should be resolved before a proposal is made to the IDC and the costs of providing uninterrupted service should be included in the cost estimates when the proposal is submitted to the IDC for endorsement.*

*(25) The Board's guidelines for cost/effectiveness analysts should include a reminder that the cost of uninterrupted power supply should be included in the estimate of capital costs.*

2.35 In the Committee's opinion the Board, in the planning of MANDATA, lacked the experience to enable it to specify accurately its site requirements (space for computer, air conditioning etc). Confusion over requirements resulted in delays and unnecessary costs. In the Committee's view this situation could have been avoided if the IDC on ADP had warned that the Board did not have the necessary experience. Efforts could then have been made to obtain the services of a qualified site planning engineer to plan requirements and co-ordinate the several departments and authorities involved in securing a suitable site. The Committee recommends that:

*\*(20) From early planning through to acceptance, departments acquiring major computer systems should obtain the services (not necessarily full-time) of a well qualified and experienced computer site planning engineer, whose responsibilities should include planning site requirements, estimating costs, co-ordinating contractors, testing site readiness and correct installation of services before delivery of the computer, and acceptance of the site.*

*(27) If this person cannot be obtained from within the Service, a qualified consultant should be engaged.*

*\*(28) Since inexperienced departments may not recognise the importance of this function or their incapacity to do the job themselves, the IDC should for the time being be responsible for advising the department of the need for the function and how to obtain the necessary skills.*

2.37 There is inadequate recognition generally of the cost of delays to major computer projects. The Committee referred to this

in a previous report, where it estimated that delaying implementation of a project costing \$20 million with a benefit/cost ratio of 1.5 resulted in loss of benefits of \$490 000 for each month of delay of implementation.

2.38 In the case of MANDATA a fault in the air conditioning installation at the computer site delayed acceptance of the computer from the manufacturer for approximately 135 days. It was fortuitous that in this case the fault did not delay development effort; in general such a delay could be expected to result in significant loss of benefits.

*\*(29) The National Capital Development Commission (NCDC) and the Department of Housing and Construction should note that delay in starting major projects can entail heavy costs and should take into account the magnitude of such costs in their efforts to ensure that site preparation is complete and correct by the scheduled delivery date. Officers should be accountable for delays.*

2.39 Poor planning and forecasting of computer accommodation requirements can also result in costly delays to computer project implementation. Building planning and construction authorities need reliable forecasts of departmental computer requirements sufficiently far ahead to allow time to provide for the aggregate expected demand for computer space.

2.40 Planning and co-ordination of accommodation and site services must be improved to ensure that computer projects are not delayed through lack of properly serviced accommodation at the time equipment is scheduled for delivery.

2.41 MANDATA has been cited as an example of a situation prevalent in Canberra of ordering a computer without having given sufficient attention to accommodation requirements.<sup>7</sup>

2.42 The Committee recommends that:

*\*(30) Departments in making returns to the Board for the purpose of ADP resource planning should include forecasts of requirements for computer room space.*

*\*(31) The Board should establish suitable procedures to ensure that forecasts are obtained from departments, aggregated into a suitable format, communicated to the NCDC and the Department of Administrative Services and incorporated in new building plans to ensure that computer projects which have been correctly forecast by departments with sufficient notice are not delayed for want of space or other facilities.*

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39. Joint Committee of Public Accounts 174th Report, Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service, Canberra 1978.

7. Report of the Auditor-General 1975-76. Parl. Paper No. 225/1976.

<sup>\*(32)</sup> When submitting proposals for computer systems to the IDC on ADP, departments should be required to include details of the arrangements made with the Department of Administrative Services for computer accommodation, with comments on feasibility and funding if such arrangements involve Australian Government buildings.

<sup>\*(33)</sup> The IDC on ADP should keep the NCDC and the Department of Administrative Services fully and promptly informed of its endorsement or otherwise of such proposals, and of any factors known to it which may change the facilities requirements previously communicated to these bodies.

#### Delivery before Contract (See Ch. 6, pp 70-71)

2.43 The central computer unit for MANDATA was delivered by Burroughs Ltd five months before a contract for its supply was executed.

2.44 The first of the minicomputers supplied by NCR Australia Pty Ltd was delivered seven months before a contract for minicomputer supply was executed.

2.45 The Committee recommends that:

<sup>\*(34)</sup> In order that the Commonwealth may retain maximum negotiating strength in the procurement of major items of computing equipment or services, it should not take delivery or allow the services to commence until a formal agreement has been executed.

#### Resource Allocation to MANDATA (See Ch. 6, pp 76-82)

2.46 The project's progress has been affected adversely from time to time by the diversion of resources from the project to activities which do not contribute to the achievement of MANDATA objectives.

2.49 We recommend that:

<sup>\*(35)</sup> Diversion of resources from the project should only be done with full recognition of the impact on project progress and following careful analysis of the costs and benefits of resource diversion, taking into account the cost of delaying implementation of the remainder of MANDATA.

<sup>\*(36)</sup> Department Heads should give full personal commitment to implementation of MANDATA, ensuring that required resources are allocated, monitoring implementation progress, and assisting staff to remove impediments to progress.

<sup>\*(37)</sup> There should be no reduction in present staff ceilings applied to MANDATA development or implementation. The desirability of increasing ceilings should be examined immediately, taking into account the benefits that will accrue from early completion of the project.

#### Failure to Use Idle Resources (See Ch. 6, pp 72-76)

2.48 The Board and several departments make extensive use of a service bureaux located at Fyshwick. The Fyshwick centre has been expanded to accommodate the work of the Departments of the Capital Territory and Immigration and Ethnic Affairs, following the removal of these departments from the MANDATA system.

2.49 The Committee is concerned that considerable expenditure is being incurred by departments with outside service bureaux and on new computing equipment while at the same time there is idle computing capacity of a suitable kind available within the public sector, e.g. within the CSIRO Division of Computing Research.

2.50 Therefore:

<sup>(38)</sup> In line with its policy of providing a range of standard computing services available to arms of Government, tertiary educational institutions and industry, the CSIRO should give consideration to making excess capacity available on the M190 computer for administrative data processing by Government departments, to the extent that it will not adversely affect the research and development use of the computer.

#### Planning the Remainder of MANDATA Development (See Ch. 6, pp 76-82)

2.51 We are not satisfied that the plans for the completion of MANDATA are sufficiently detailed either for review and approval by users and senior management of the Board, or for accurate project cost estimating.

2.52 The Committee recommends that:

<sup>\*\* (39)</sup> The MANDATA Program Office should prepare definitions for all major subsystems comprising Phases 2 and 3 of MANDATA in sufficient detail to allow accurate cost estimating.\*

<sup>\*\* (40)</sup> The Program Office should use these product definitions to prepare cost estimates for the remainder of the project.

<sup>\*\* (41)</sup> Such cost estimates should be employed for review, in conjunction with users, of the cost-effectiveness of optional features and requirements, and for project cost control.

<sup>\*\* (42)</sup> Such cost estimates should be reviewed and revised as proposed system requirements change.

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\* See Appendix 9 for a definition of the three phases currently envisaged for MANDATA development. Phase 1 and parts of Phase 2 are complete. Phase 3 is scheduled for completion by mid 1981.

Purchase of Equipment not Required (See Ch. 6, pp 82-87)

2.53 Equipment for data communication control was purchased for the MANDATA system and later dropped from the design thereby incurring unnecessary costs of over \$500 000.

<sup>1</sup>(43) *When designing data communications systems, departments should maintain close liaison with Telecom from early planning stages so as to be aware of forthcoming data communication facilities and to enable the most cost-effective design to be achieved before equipment is purchased.*

CHAPTER 3

THE ORIGIN AND DEVELOPMENT OF MANDATA

INTRODUCTION

3.1 The use of a computer as an aid to personnel administration is now common in larger organisations in Australia and overseas. In the simplest implementation, personnel records are stored on computer files, and individual records may be viewed by obtaining a print-out of them or on visual display terminals.

3.2 At the other end of the scale is the large system in which up-to-date information is accessible on demand about personal details, personal history, positions, establishment levels, vacancies, definitions of both formal and informal organisations, and entitlements such as leave and superannuation. Complex rules for advancement, transfer or remuneration are administered automatically and the system is linked to pay and superannuation programs.

3.3 In the late sixties the Canadian, U.S. and U.K. civil services were in various stages of development of computer-based personnel systems with a variety of design objectives. The Public Service Board believed that the feasibility of similar developments should be examined in Australia.

3.4 Furthermore, work had been proceeding in a number of departments on the application of computers to various aspects of personnel record-keeping. They included Treasury (payroll system), the Superannuation Board, Departments of Supply and Civil Aviation, the Bureau of Meteorology, the Post Office and the Department of Defence. The Board considered that similar developments could be expected to occur in due course in other departments and that this would result in duplication of efforts and the establishment of incompatible systems.

3.5 In view of these factors, the Committee considers that it was a correct decision by the Board to investigate the economics and feasibility of developing a computer-based Service-wide personnel and establishment record system.

3.6 The feasibility study was carried out by the Board's Management Services Division which issued its report on the study in November 1971. The report recommended the development of MANDATA as a centralised computer-based system located in Canberra covering the whole Public Service population and serving all departments and statutory bodies.

3.7 The Board agreed in principle to the MANDATA proposal and sought the views of thirty-one Permanent Heads and Heads of statutory bodies. According to the Board:

There was a general consensus in favour of the MANDATA system. All expressed their willingness to co-operate should the Board decide to proceed with the development of the system.<sup>13</sup>

3.8 Staff Associations were informed of broad plans for MANDATA. According to the Board they "did not raise any significant matters".

3.9 A firm of consultants - Computer Sciences of Australia - was engaged in 1972 to report on the feasibility and economics of the system as planned. The consultants generally supported the Board's proposals but raised a number of important reservations. Their findings are summarised in Appendix 7.

3.10 The Committee does not know at what stage the decision was taken that the Board itself would carry out the development of MANDATA, or whether in fact any alternative was ever contemplated. One witness who has been involved in computer developments in the Public Service for many years gave the opinion that a factor contributing to the Board's decision to develop and implement MANDATA was that it wished to build 'hands-on' experience with a large computer of its own. As we pointed out in our 174th Report, the Board's ADP Division has been a major influence in co-ordinating ADP developments.<sup>39</sup> In order to perform this role effectively, the ADP Division evidently felt that it needed direct experience that could only come from developing and operating its own computer and that its credibility as an authority on ADP matters would be enhanced. Unfortunately much of the experience gained has been subsequently lost to the Board in staff movements and, if anything, the reputation of the Board as an ADP authority has been damaged rather than enhanced by its handling of some aspects of the project.<sup>24</sup>

J.1.1 We consider that the Public Service Board underestimated the magnitude and difficulties of MANDATA and overestimated its own capability to carry out the development in an efficient manner.

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13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

24. Joint Committee of Public Accounts, Minutes of Evidence Taken In-Camera, p. 372, 1978.

39. Joint Committee of Public Accounts 174th Report, *Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service*, Canberra 1978. Parl. Paper No. 341/1978.

#### REVIEW AND APPROVAL

3.12 In October 1972 the IDC on ADP appointed a sub-committee to review and report on the proposed MANDATA project. Seven months later the IDC received the report of the sub-committee and endorsed the Board's proposal to proceed.

3.13 Cabinet gave approval in principle to the project in February 1974. It did so on the basis of different costs and benefit estimates from those endorsed by the IDC the previous May. Between the IDC meeting and the Cabinet meeting, the Board has prepared revised estimates of cost which, as events proved, were more accurate than those reviewed and endorsed by the consultants and the IDC.<sup>17</sup>

3.14 In August 1974 tenders for MANDATA equipment were called. In June 1975 a letter of intent was issued to Burroughs for the equipment for the central site. This was delivered in February 1976 but the contract with Burroughs was not signed until five months later. A further two months elapsed before the equipment passed its acceptance tests in September 1976. Of the seven months between delivery and acceptance, 135 days are accounted for by delays to acceptance caused by deficiencies in the environment of the computer room.<sup>13</sup> The Board considers that the delay in acceptance did not cause a delay in essential program development since use was made of the Burroughs Data Centre at Fyshwick for development work.

3.15 It may be seen from the above that the time from the decision by the Board to proceed with the project until acceptance of the main computer was three and a half years. The Committee previously pointed out that unduly long delays are occurring in Australian Government computer procurement between the decision to proceed and the start of implementation.<sup>39</sup> The period of three and a half years for MANDATA greatly exceeds the time that would be expected in the private sector for an equivalent procurement. Even leaving out the 135 days which were due to site problems, there was a period of over three years of which sixteen months was the interval between Cabinet approval and a letter of intent for the central computer system.

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13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

17. Computer Sciences of Australia Pty Ltd, *MANDATA - Review and Recommendations*, report to the Public Service Board, October 1972.

39. Joint Committee of Public Accounts 174th Report, *Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service*, Canberra 1978. Parl. Paper No. 341/1978.

3.16 We have referred elsewhere to the heavy cost of delay in procurement. The cost to the Government of delays in implementing MANDATA, if costs and benefit estimates are accurate, is of the order of \$440 000 per month. Such costs for past delays in the case of MANDATA are now irrecoverable. However, improved performance in procurement is possible for future projects and the Committee strongly recommends a program to improve the efficiency of the computer acquisition process in the Public Service.

#### WITHDRAWAL FROM MANDATA BY TELECOM AND AUSTRALIA POST

3.17 MANDATA was originally intended to service the staff covered by the Public Service Act, the Naval Defence Act and the Supply and Development Act, in all numbering approximately 300 000 persons.

3.18 In April 1974 the Prime Minister announced that the then Postmaster General's Department would become independent of the Public Service Board by the creation of separate statutory authorities to administer the Postal and Telecommunications Services. In 1975 the newly formed Telecommunications and Postal Commissions decided that they would not participate in MANDATA and advised the Public Service Board accordingly.

3.19 Australia Post had decided that:

... there were other reasons, apart from independence from the Board, which indicated that the Commission should have complete control over its own staff records system. These are -

- The proposal (and then current intention) that the basic four Division structure of the Commonwealth Public Service should not be translated to the Commission Service and the consequential change in career streams and structures which may flow from that proposal.
- The necessity for greater flexibility in organizational and industrial matters and the probability that this would press hard against system constraints related primarily to a Public Service environment.
- The absolute necessity for close inter-relation between staff records and pay systems and the facility to change either or both as required by changing needs and in terms of priorities established by the Commission.
- Cost: MANDATA was regarded as expensive and, with the probability of greater devolution of work to (Postal) District levels and a need for adequate servicing of staff at those levels, costs would increase further. As all costs ultimately must be covered by postal charges, the

Commission would have to use systems related to its needs and industrial situations and what it could afford.<sup>48</sup>

3.20 Telecom's reasons for withdrawing included:

• Telecom staff had never been included in the Treasury Pay System and the close interdependence of personnel records and the payroll function would have meant that MANDATA would have to interface with the Telecom Staff Pay system. Subsequent changes to the Telecom Staff Pay system could also be expected to involve expensive and possibly protracted modification to MANDATA.

• It was undesirable to be dependent on MANDATA, a system not directly under the control of Telecom, for part of the activity necessary to pay staff, particularly as Telecom had been under heavy pressure from staff associations to provide improved responsiveness and flexibility in its pay procedures.

• The relationship of MANDATA with the Public Service Act and its provision of facilities for Departments covered by this Act may not have provided sufficiently for differing conditions required by the operation of Telecom.<sup>49</sup>

3.21 Furthermore Telecom held reservations about the cost-effectiveness of MANDATA as applied to Telecom's decentralised management structure. Telecom also considered that the technical difficulties of MANDATA had been underestimated by the Board and that it could automate its own personnel record keeping in a much simpler manner that would meet all the needs of Telecom at an attractive cost.

3.22 The Public Service Board considered the decisions by Telecom and Australia Post to be ill-advised.

3.23 The submission to Cabinet in early 1974 had covered facilities to allow participation by the Postmaster General's Department. When Australia Post and Telecom advised the Public Service Board in 1975 that they would not participate, the configuration of equipment required for MANDATA was reduced and the subsequent contracts with Burroughs and NCR did not cover the equipment for these authorities.

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43. Managing Director, Telecom Australia, letter to the Secretary, Joint Committee of Public Accounts, 19 July 1978.

48. Secretary, Australia Post, letter and attached statement to the Secretary, Joint Committee of Public Accounts, 8 September 1978.

3.24 Subsequently both Commissions commenced development of computer-based systems suitable for their own needs and one of these is described in Appendix 2.

3.25 In view of the strong reservations about the feasibility and cost-effectiveness of MANDATA expressed by Telecom in 1975, the Committee was astonished when the Board said in September 1978 that it had not contacted Telecom to review the design of the latter's personnel and establishment system (PIES).<sup>1</sup> In fact senior officers of the Board and the MANDATA Program Office admitted that they knew little of Telecom's development or of the system being developed in Brisbane for the Queensland Public Service Board (called MANPOWER), in spite of the similarity between the objectives of these systems and that of MANDATA (see Appendix 2).\*

3.26 A witness for the Board explained its lack of interest in PIES and MANPOWER by saying that:

We have a comprehensive system which has proved cost-effective on whichever set of cost estimates you look at. It was blessed by the Labor Government in 1974 when it was first introduced and on two more recent occasions the project has been endorsed by the present Government. We have seen no reason to involve ourselves in any detailed way with the work of these two commissions. (Australia Post and Telecom). (p. 352).

...A major study is going to take resources in looking in depth at systems other people are doing. I think there would be a danger. People would say our objective had been set at government level and we ought to be directing our resources to the achievement of it. (p. 354).<sup>1</sup>

3.27 Considering the overall cost of MANDATA and the relatively trivial cost of looking at these related systems we cannot accept that the Board was justified in ignoring them. In our view it was either an extraordinary example of tunnel vision or else an arrogant assumption of superiority of system design capability that made it unnecessary to examine any alternative approach. In either case we deplore the attitude.

3.28 As a result of the Committee's questions, officers of the MANDATA Program Office visited Brisbane and Melbourne to examine MANPOWER and PIES in more detail. Predictably they reported that these systems had little or nothing to offer MANDATA.

\* One officer of the MANDATA Program Office did in fact know a little about MANPOWER. When asked why the MPO had not looked at Queensland he said:

I took the opportunity of spending time - only an hour I admit - with the Queensland people in Brisbane.<sup>1</sup>

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.

#### REVIEW OF STRATEGY

3.29 During 1976 and early 1977 a review was carried out by the Public Service Board of the MANDATA development strategy. The 1971 feasibility study had recognized that it would not be possible to develop the system in its entirety before implementation began. It was thought then that the most significant economic benefits would stem from replacement of Standard Personnel Record (SPR) cards by magnetic records and the processing of allowances leading to the provision of pay information to the Treasury.

3.30 In reviewing the development and implementation strategy in 1976 the Board concluded that system development should give priority to the provision of a more effective management information facility; improvements to the efficiency of record-keeping operations would follow.<sup>2</sup> It was also decided to make use of elements of the computer system developed by the Department of Productivity for personnel record administration. By this means it was expected that an initial system could become operational significantly earlier than would otherwise be possible.

3.31 In June and July 1977 a firm of consultants, P.A. Consulting Services Pty Ltd, undertook an independent review of MANDATA. Some of their key findings are summarized in Appendix 8. They carried out their review in an atmosphere of immediate cost reduction within the Public Service and this led them to suggest some re-arrangement of priorities in MANDATA development. As a result of the consultants' analysis of benefits, the Board apparently changed its mind about concentrating first on the potential management benefits of MANDATA. The Board told the Committee that it took a policy decision to concentrate on the achievement of the elimination of SPR cards and establishment records in departments since this was the area that offered the most immediate and direct pay-off through clerical staff reductions.

#### IMPLEMENTATION RESTRICTED TO A LIMITED NUMBER OF DEPARTMENTS

3.32 In October 1977 it was decided to restrict implementation initially to twelve organisations, namely the Departments of:

Prime Minister and Cabinet,	Transport,
Education,	Trade and Resources,
Defence,	Veterans' Affairs,
Primary Industry,	A.C.T. Schools Authority,
Foreign Affairs,	Auditor-General's Office
Business and Consumer Affairs,	Public Service Board

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978. P. 414.

25. Public Service Board 53rd Annual Report 1977. Parl. Paper No. 197/1977.

3.33 By June 1978, data on organisations, personnel particulars and position occupancy had been transferred from manual records to computer files for the first six of the above organisations and we understand that the transfer of data for the remainder is now nearly complete. Since mid-1977 the development of a number of MANDATA system modules has been completed and implementation is in various stages in certain departments.

3.34 From June 1977 until early 1979, the Department of Productivity software was run on the Department of Transport's computer in Melbourne using MANDATA forms and procedures. From October 1977 output from the Department of Transport computer was put on to magnetic tape and sent to Canberra where it was printed on the Board's B7700 computer. This state of affairs continued through-out 1978.

3.35 In February 1979 development of the LEAVE system was substantially completed.

3.36 At the present time the following sub-systems have been completed or are "in the final stages of development".

- Recording of leave entitlements
- Maintenance of salary and allowance data for designations
- Record updating on the MANDATA B7700
- Enhancement of the system to allow the elimination of SPR card recording.<sup>1</sup>

3.37 The development of the above subsystems is currently known as Phase 2. Planned for the future and to be completed by mid-1981 are the component subsystems of Phase 3, namely:

- The discontinuance of the Board's Continuous Record of Personnel system
- The calculation of pay entitlements and the link with the Department of Finance payroll and Australian Government Retirement Benefits Organization
- The integration of Leave and the Establishment and Personnel Systems into one system
- Minor extensions and improvements to existing products.

#### HAS THE CONCEPT OF MANDATA CHANGED?

3.38 The Public Service Board claims that the original concept of MANDATA has not changed "as to the basic services that will be provided to the customer...The major facilities that were envisaged for the departments in 1971 are still included in the plan". The Board did admit that there would be a diminution in the level of service to users because it had to accept "trimming of expenditure in certain areas with this project because of the Government's overall budgetary position".

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.

33. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 27 April 1979.

3.39 We understand that reductions in service levels fall into four categories:

Firstly the response time for enquiries is expected to be fifteen to twenty seconds, not five to ten seconds as specified in the 1971 feasibility study. This means that a user at a visual display unit in a department will have to wait fifteen to twenty seconds for the response to his enquiry to be returned to the screen.

Secondly the response time for 'interrogations' will be extended. It was envisaged in the original feasibility study that an authorised user might, for example, wish to perform a complex statistical analysis using relationships among various data elements drawn from several parts of the data base. The provision of this capability is one of the main justifications for using a comprehensive data base as opposed to periodic file processing operations such as are planned for the Telecom PIES system (see Appendix 2).

The original feasibility study report said:

it is emphasized that the flexibility of the proposed interrogation facility would allow the selection and association of virtually any combination of elements in the comprehensive data base...in addition, ancillary facilities would be provided which would enable detailed mathematical and statistical analysis of the information extracted by the interrogation facility.<sup>2</sup>

The 1971 study did not specify any response time for interrogations but did say that they would be scheduled for execution at times during the day when the processing workload was known to be low... Interrogations having a high priority would be processed at the earliest practicable time. The Board now advises that the processing of any one interrogation will be overnight or over two nights and that the turnaround time will be up to forty-eight hours.

Thirdly, with regard to the updating of records, the feasibility study stated that some would be immediate but generally all would be completed within twelve hours. Present plans are that there will be no immediate updating. Information entered via users' terminals will be stored and the processing will be done outside the prime shift every second night.

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2. Public Service Board, *MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System*, November 1971.

Fourthly, the feasibility study report refers to regular and ad hoc reports to management of user departments consisting, for example, of statistical summaries and listings relating to staff and establishments.<sup>2</sup> Apparently this cannot now be guaranteed.<sup>3</sup>

3.40 Although it will be claimed that these changes are reductions in service-levels rather than variations in the concept of MANDATA, they may be large enough to reduce the utility of the system appreciably. They may therefore bring about significant reductions in the potential savings from improved management information and even in the potential clerical savings. This should be taken into account in recalculating expected benefits as recommended in Paragraph 4.29.

## CHAPTER 4

### PUBLIC SERVICE MANAGEMENT AND MANDATA

#### SCOPE

4.1 In this chapter we shall examine the role and effectiveness of:

- i) the senior officers and management of the Public Service Board in planning and control of development;
- ii) departmental management in the planning, development and use of the system;
- iii) the Interdepartmental Committee on Automatic Data Processing (the IDC on ADP);
- iv) the management of the project itself.

#### ROLE OF THE BOARD'S SENIOR MANAGEMENT

4.2 From the evidence, the Committee found that during 1977 and 1978, and probably earlier, the Commissioners of the Board had not been well informed on MANDATA progress and had not been effectively reviewing and controlling project development. We formed this opinion from the difficulty we experienced in obtaining detailed, clear and prompt documentation of project progress and cost from MANDATA technical personnel. If adequate formal management reviews of the project's progress had been taking place within the Board, the answers sought by the Committee could have been produced at our hearings or very soon thereafter. As it was, the MANDATA Program Office found it necessary to spend considerable time in preparing responses to our questions - responses which for the most part would have been already available if progress were being regularly reported in the required detail to senior Board management.

4.3 A further indication of inadequate control by top management came after the Chairman of the Public Accounts Committee made a statement to Parliament in May 1977 about the costs of MANDATA.<sup>4</sup> He stated that there had been significant but as yet unexplained increases in the estimates of project costs since the feasibility study in 1971 (see Chapter 5). Subsequent discussions between the Board and the Committee aimed at reconciling the earlier and later estimates revealed that the Board lacked thorough familiarity with past cost estimates and that concise project cost-to-date documentation did not then exist.

4.4 It is evident to the Committee that the senior management of the Public Service Board is now giving much more attention to MANDATA than it did in the early days of its development. The Auditor-General's Reports, the Inquiry by this Committee, and

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.
2. Public Service Board, *MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System*, November 1971.

5. Connolly, David M., M.P., House of Representatives Hansard, 31 May 1978, pp 2811-2813.

user dissatisfaction have contributed to an increased recognition that large-scale ADP is a matter for top management concern. The management of the MANDATA Program Office now report to the Board every two or three weeks to review progress and to discuss options that are open and decisions that have been taken.

4.5 For better or worse, the Board has taken on the task of system development of MANDATA. Ultimately therefore the responsibility for ensuring that service-level goals for MANDATA are met rests with the Commissioners of the Public Service Board. While it is understandable that non-technical management should hesitate to try to engage in such a complex project, nevertheless in the exercise of their responsibility, the Commissioners should insist that they be kept fully informed on progress and performance in clear, non-technical language. The onus must be placed on the development team to produce comprehensible, concise management reports of progress and cost at regular intervals. The format and frequency of management reviews are matters for the Board's management to determine. However, the Committee suggests that the Commissioners might review with project management and with users the project's goals and achievements at approximately three monthly intervals. At these meetings the following questions should be answered for the overall project and for each major subsystem:

- . Is the module on-time?
- . Is the module within cost budget?
- . Is the design objective still feasible?
- . Is the user-benefit still obtainable and justified?

4.6 If the answer to any of the above questions is in doubt, more information should be sought. If the answer is 'No', new objectives for project milestones and cost, or product specification should be proposed by project management and agreed to by the Commissioners.

4.7 The frequency and content of reports to, and review by, top management should be planned as part of the process of improving the overall formal framework of project review which we discuss later in this chapter.

#### Need for a Requirements Specification

4.8 A pre-requisite for effective oversight is that top management be provided with and agree on 'requirements specifications' for the whole system and for major subsystems. As early as 1972, consultants on the project, Computer Sciences of Australia, recommended that a requirements specification be developed.<sup>17</sup>

17. Computer Sciences of Australia Pty Ltd, MANDATA - Review and Recommendations, report to the Public Service Board, October 1972.

This "concerns itself with enumerating precisely what characteristics a system must have in order to meet the given objectives; it is not concerned with how those objectives will be achieved."

4.9 The consultants listed four primary uses for the requirements specification.

- . To provide responsible upper management with a means of assessing whether their intentions are being carried out and with judging their own handiwork by an expression of the implications of the objectives set forth;
- . To guide the system design process by giving a basis for the decision-making inherent in constructing a sound and consistent design;
- . To serve as a guide for the quality assurance activity by offering a list against which the features of a design may be compared point by point;
- . To specify to the system test activity the means by which a system, once functional, can be measured to determine whether it meets its objectives.

4.10 The Board did not implement CSA's recommendation for a requirements statement. It is unfortunate that no such statement has ever existed for MANDATA. Large areas of the functional requirements always have been and still are unspecified or specified in only vague terms. The absence of such a document makes it very difficult for management outside the project to grasp fully the overall design goals and to hold the project team accountable for their achievement. The latter may be the reason the document has never been produced. The Committee considers that this is not consistent with sound system development practice and that although it is late in the development cycle, such a requirements specification should be prepared immediately.

#### Wider Concern of the Board's Management

4.11 The Committee considers that the Commissioners of the Board should also continue to involve themselves in the broader issues of MANDATA, including:

- . issues of privacy, security and right-of-access to the data base;
- . the impact of MANDATA on people within the Service, including the formulation of policies and plans for staff reductions;

the setting of quantified objectives for service levels to be provided by the MANDATA system to the users, and the measurement of actual service levels against such objectives.

#### 4.12 Recommendations

- \*\* (1) *The Commissioners of the Public Service Board should issue a comprehensive statement of the objectives for MANDATA to provide a fundamental basis for planning and control.*
- \*\* (2) *A comprehensive requirements specification should be prepared promptly by the MANDATA Program Office in consultation with major users. This document should set out the objectives for the system as determined by the Commissioners, and the characteristics necessary to meet those objectives, including:*
- definitions of inputs, processing and output*
  - security and privacy provisions*
  - reliability goals*
  - maintainability and restartability features*
  - user-interface performance goals*
- \*\* (3) *The requirements specification should be agreed to by the Commissioners of the Board and used by them in reviewing progress against goals.*
- \*\* (4) *The Commissioners should continue to review carefully project progress and cost and product quality, and to ensure optimum resource allocation to the project. If costs significantly exceed estimates, or benefits fall below estimates, or product quality does not meet the goals set for it, corrective action should be taken.*
- \*\* (5) *The Commissioners should ensure that a comprehensive policy is published which states what kinds of information in MANDATA are restricted as regards access, and who is entitled to have access to each kind of restricted information.*
- \*\* (6) *The Commissioners should satisfy themselves that effective controls exist in design and operation of MANDATA to ensure that only authorised officers may have access to any information, and then to only those parts of the information which they are specifically entitled to view or change.*
- \*\* (7) *The Board, as the appropriate authority, should set quantified objectives for quality-of-service levels to be provided by the MANDATA system and should communicate these to users. Actual service levels achieved in operation should be measured and the results reported to users.*

- \*\* (8) *The Commissioners of the Board and Permanent Heads of user departments should ensure that detailed plans are formulated promptly to bring about the changes in organisation structure, the redefinition of duties, the redeployment of people and the changes in numbers of staff that will be necessary to ensure that planned cost savings are realised within the planned timeframe.*
- \*\* (9) *The Commissioners and Permanent Heads should publicly and immediately make quite explicit what impact they expect or intend MANDATA to have on staffing levels, organisation and duties.*

#### THE USERS

4.13 The Public Service Board was responsible for the feasibility study, design and specification of the MANDATA system. However, from time to time between 1970 and 1973, Permanent Heads of all departments were informed of the Board's plans and were asked to comment on them. (see Chapter 3). The most detailed definition of MANDATA which was given to Permanent Heads, was in a letter in April 1972 from the Chairman of the Public Service Board (see Appendix 8). According to the Board, replies from Permanent Heads to the letter:

...varied from explicit agreement from fifteen Permanent Heads, implicit agreement from four Permanent Heads, to a non-committal reply from four Permanent Heads.

Of the nine departments that had not replied at that time eight departments subsequently indicated support for the project and one indicated support for the project but suggested that a pilot study should be made first.<sup>11</sup>

4.14 None of the Permanent Heads opposed MANDATA although, since management consultants were engaged to report on its feasibility and economics, some evidently raised questions about whether it could be developed and implemented as planned.

4.15 The consultants reported that:

the centralised MANDATA system as conceived, designed and planned is justified, is technically feasible, and is capable of being implemented generally in accordance with the schedule and cost estimated.<sup>7</sup>

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11. Public Service Board, Submission to the Joint Committee of Public Accounts, 6 September 1978.

17. Computer Science of Australia Pty Ltd, MANDATA - Review and Recommendations, Report to the Public Service Board, October 1972.

The consultants advised against the pilot development which had been suggested by one Permanent Head and, in the event, conformity with original cost estimates and schedules has not been achieved (see Chapter 5).

4.16 A standing committee of representatives from major user departments (the MANDATA Co-ordinating Committee) was formed in 1972 to allow departments to participate in the development of the system (see Appendix 3). This Committee is still in operation and meets at present every 6 to 8 weeks.<sup>33</sup>

4.17 In the light of the foregoing we consider that the Board provided reasonable opportunities for departments to participate in the initial planning of MANDATA in the period up to the end of 1973. There is considerable doubt that during that period all Permanent Heads availed themselves of the opportunity to participate by ensuring that they fully understood what they were supporting (or not opposing).

#### Project Review in 1977

4.18 In 1977 consultants were again engaged to review and report on several aspects of the project, among which were:

the management improvement objectives, including the provision of a statement on the management benefits which could be realistically expected, whether such benefits can be expressed in monetary terms and if so, their expression in these terms.

The consultants stressed the importance of management commitment at high level in the Public Service, pointing out that MANDATA is an aid to management and the achievement of the management benefits rests with the departments themselves (see Appendix 8).

4.19 In order to evaluate the potential contribution of MANDATA in areas other than the expected clerical savings the consultants interviewed five heads of departments and a number of senior officers in the Public Service Board.

4.20 The consultants estimated that there would be a salary saving up to 1989, of \$94m. Accordingly they concluded 'that the potential management improvement benefits are significant.'

4.21 The Committee has certain misgivings about this estimate. These arise from the following:

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4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*, June/July 1977.

53. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 26 July 1979.

• Only five Heads of departments were interviewed out of a total of thirty departments and statutory bodies. The staff population of these departments comprised approximately 37 per cent of the total staff to be covered by MANDATA.

• Of these five, three were fairly optimistic about the potential management benefits, one questioned the need for the on-line approach being adopted for MANDATA, and one felt that in smaller departments there would not be extensive savings from more effective management action.

• None of the Permanent Heads who thought that MANDATA would provide significant management benefits is likely under present arrangements to be held accountable in the future for any failure on his part to achieve those 'expected benefits'.

4.22 Overall, the consultants' reports of the interviews do not give us confidence that the view is widely or strongly held at Permanent Head level that MANDATA will be an effective aid to senior officers in managing their departments more effectively. While there may be widespread departmental commitment to use MANDATA for improved manpower management it is not apparent in this small sample of interviews with Permanent Heads.

4.23 Commitment to improved manpower management is a vitally important ingredient in the achievement of the estimated management benefits of the MANDATA system. In our view such commitment, to be credible, should be expressed by all Permanent Heads as an undertaking to achieve a nominated level of savings by a given time as a result of MANDATA, and a willingness to be held accountable for the results actually obtained. Even though the consultants took into account staff savings in the larger departments only and allowed time for the acquisition of management experience, these steps cannot give confidence in the estimates of management benefits (potentially achievable though they may be) unless they are accompanied by an undertaking by departments to achieve the savings. No such formal undertaking has been given. Until it is, the estimated management benefits remain, in any cautious and rational evaluation of MANDATA, little more than pious hopes.

4.24 If, on the other hand, Permanent Heads who well understand what MANDATA is supposed to do find that they cannot give any such undertakings because they cannot estimate even conservatively the benefits that may come to them from MANDATA, then this too should be made known so that the uncertainty that attaches to the expected dollar value of management benefits will be clearly visible.

### Management Training Needed

4.25 MANDATA cannot itself produce management benefits. Benefits will only flow from the skilful application of the information available on MANDATA to the pursuit of worthwhile objectives.

4.26 We have strong doubts that manpower management skills within the Service are sufficient to achieve the potential that MANDATA offers. We consider that there is a critical need to train departmental managers in the techniques of human resource management, covering for example:

- . The planning of forward requirements
- . Matching positions with skills
- . Career planning
- . Resource allocation
- . Planning of staff development to meet future needs

4.27 Not only does MANDATA have the potential to assist in obtaining higher productivity through improved co-ordination and efficiency; it also has the potential to help achieve a more satisfying working environment because of improved opportunities to match skills to positions and to plan individual career paths. Again it must be stressed that the ability to apply advanced concepts of human resource development will not flow automatically from MANDATA. This challenging task is however made more tractable by having ready access to the kind of information which MANDATA can hold on-line.

4.28 Other management benefits, given the necessary managerial skills, are:

- . Greater flexibility to handle organisation change with less disruption to output
- . Better administration of staff ceilings
- . The ability to restructure the organisation to serve better the objectives of the Service or to meet changing needs
- . The ability to forecast attrition more accurately
- . The ability to plan effective rotational assignments (but see the article by Knight for some possible pitfalls)<sup>31</sup>

### Recommendations

4.29 We consider that potentially the MANDATA system can be of benefit by assisting in the more effective utilization and development of human resources within the Service. Because the achievement of such benefit depends critically on whether the goals being pursued are worthwhile, and on the ability of management to use the information which MANDATA will make available,

31. Knight, F.C., Data Stream and the Individual within the System, *Optimum*, 4(3) pp 42-49.

we recommend that:

- \*\* (10) *The Public Service Board should without delay prepare up-to-date detailed estimates of the expected savings and other benefits from MANDATA.*
- \*\* (11) *Quantified objectives should be set within departments for the achievement within specified times of management benefits resulting from the use of MANDATA. Department Heads should formally acknowledge them to be worthwhile and should undertake to achieve them. Performance in the achievement of the objectives should be measured. If the aggregate dollar value of the objectives differs from the estimates of benefits contained in Chapter 5 of this report, Parliament should be informed of the extent of the difference and the reason for it.*
- \*\* (12) *To help managers achieve the designated management benefits of MANDATA, training appropriate to present skills levels and future duties in human resource management should be given to all managers in user departments and in the Public Service Board, with particular reference to the use of the new system.*

### Consultants' Recommendations for a Project Board of Management<sup>4</sup>

4.30 One of the recommendations that arose from the 1977 review was the:

...establishment of a Project Board of Management with up to five representatives of key departments at about Permanent Head level.

This recommendation was not put into effect. An officer of the MANDATA Program Office expressed the view that such a Board would be an unnecessary duplication of and less effective than the MANDATA Co-ordinating Committee as a means of determining user wants. However, we do not see the function of this Board as significantly overlapping that of the MANDATA Co-ordinating Committee.

4.31 The consultants said in their report:

It became clear that only persons responsible for shaping and guiding the overall operations of a department would be in a position to evaluate the potential contribution of MANDATA (in areas other than clerical savings).

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4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*, June/July 1977.

We agree with that view and we think that the consequence of it is that not only departmental technical personnel but also senior general managers must regularly monitor the product that is being developed to satisfy themselves that it will enable them to improve staff efficiency and achieve other goals.

4.32 We recognize that not all Permanent Heads would be willing to devote time to overseeing the MANDATA project. Obviously a committee of persons who neither understand nor particularly care what MANDATA does is not going to be beneficial. If however Permanent Heads were committed to and accountable for the achievement of specific staff reduction goals or other planned savings - as we believe they should be - then such managers would doubtless wish to be aware of and to influence MANDATA's future design options. We see the Board of Management, as recommended by the consultants, as a suitable vehicle for exercising such influence.

4.33 Because the project's development is well advanced, much opportunity to involve Permanent Heads has been lost. Nevertheless sufficient development work still remains to justify a greater involvement of Permanent Heads than currently exists. We suggested earlier that at intervals of every three months Commissioners of the Board should review project goals and their relevance to user needs. This is obviously the occasion to bring together the Permanent Heads of major departments (or their senior general management delegates, but not ADP technical managers or personnel managers). Thus, the Board of Management, or steering committee, would comprise both top level users and producers of the MANDATA system together with the Director of the MANDATA Program Office.

4.34 The role of this group would not be primarily to challenge or control the way MANDATA is being run (although that might subsequently be the result of policy decisions taken at the higher level). The role of the group would be to ascertain whether MANDATA is providing and will continue to provide the tool that will enable departments to meet the stated goals (eg estimated savings of some \$94 million in the form of general staff reductions over the next ten years<sup>4</sup>).

#### 4.35 Recommendation

<sup>\*\*</sup>(13) *The Board together with Permanent Heads of the major user departments should form a Project Board of Management, meeting quarterly, to review the product and satisfy themselves that it will enable them to achieve their goals within the planned timetable. If not, appropriate corrective action should be initiated.*

4. P.A. Consulting Services Pty Ltd, Review of MANDATA, June/July 1977.

#### THE INTERDEPARTMENTAL COMMITTEE ON ADP

4.36 There is no evidence available to us which suggests that the IDC on ADP played any role in preventing, reducing or even foreseeing the many difficulties which have plagued the MANDATA project. This is a matter of concern to the Public Accounts Committee since both the Board and the IDC have a responsibility for reviewing the ADP proposals of other Service departments, yet they failed to assess correctly the scope and resource requirements of the Board's own system.

4.37 The contribution made by the IDC after its initial endorsement of the original MANDATA strategy was described by the Board in a reply to a question by the Committee:

The IDC was advised of the original strategy of MANDATA and gave its endorsement in principle to the plan and for the initial equipment acquisition. It has since re-examined the matter at the times when expansion of equipment was involved to support service bureau operations. Changes to date have been mainly in the priorities of implementation. There has been no significant expansion of equipment for MANDATA purposes since the acceptance of the original public tenders. Some expansion of the software requirements, particularly in relation to the mini-computers, has been required and this was submitted to the IDC for endorsement.<sup>11</sup>

4.38 The Committee asked the Public Service Board to "provide the original submission put to the IDC on MANDATA".<sup>1</sup> In response, the Board supplied only the 1971 Feasibility Study.<sup>2</sup> The Committee asked for the minutes of the IDC meetings at which the MANDATA project was considered. The Board in response provided a summary of considerations by the IDC rather than the full minutes.

4.39 The Board stated that it was reluctant to release the full minutes because:

- (a) they included confidential deliberations on the choice of tenderer;

1. Joint Committee of Public Accounts, Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1, Minutes of Evidence, 1978. F.142.
2. Public Service Board, MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System, November 1971.
11. Public Service Board, Submission to the Joint Committee of Public Accounts, 6 September 1978.

- (b) it was contrary to the general policy of the Government to release details on the internal deliberations of inter-departmental committees.<sup>14</sup>

4.40 According to the summary which was provided, the IDC on ADP gave consideration to the MANDATA project on eleven occasions between 1972 and 1977. The IDC endorsed the MANDATA proposal at one of these meetings (31/5/73) following a presentation of the findings of a sub-committee appointed in October 1972 to review and report on the project. We asked to see the report of the sub-committee to the IDC but the Board was reluctant to release it for the same reasons that it was reluctant to release the full minutes of the IDC. According to the information given to us, eight subsequent meetings of the IDC discussed only technical questions related to undertaking the project.

4.41 The IDC agreed to support the MANDATA project in May 1973 and Cabinet gave approval to the project in February 1974. However the estimated costs and benefits of MANDATA contained in the 1974 Cabinet submission were materially different from the estimates contained in the 1971 Feasibility Study which was presented to the IDC by the Board in September 1972.

4.42 This came about because the Board revised its estimates of costs and benefits *after* the endorsement of the proposal by the IDC and *before* approval by Cabinet. The changes were not formally endorsed by the IDC.

4.43 It is of interest to note that the only significant change made to the 1971 cost/benefit estimates by the IDC was to reduce the benefits estimate by 27 per cent. When the Board later revised its cost and benefit estimate prior to submission to the Cabinet, it *restored* the benefit estimate that had been removed by the IDC, on the grounds that the particular item was a realistic expectation.

4.44 These matters throw light on the general workings of the IDC and particularly on its contribution to the decision to proceed with the project. MANDATA is one of the largest computer projects undertaken by the Public Service and we would therefore expect the amount of consideration given to it by the IDC, and the contribution by the IDC to making it a successful project, to have been proportionately large. It appears that this is not the case. At the relatively small number of meetings at which the IDC discussed MANDATA, attention was apparently focused on such issues as the invitations to tender, the choice of vendors and the operational reliability of certain equipment. While these matters are appropriate ones for IDC attention, one might expect

14. Chairman, Public Service Board, letter to the Chairman, Joint Committee of Public Accounts, 22 August 1978.

co-ordinating role of the IDC would have caused it to discuss at some length the managerial and strategic aspects of MANDATA. There is no evidence that it did so.

4.45 This is a large and complex project even by present day standards. Considering the lower level of skills, ADP product technology, and experience that existed in 1973, MANDATA was an even more ambitious undertaking when the IDC endorsed it than it would be if it were to be started today. In addition the Board had no experience whatever in large system development. In the circumstances it is astounding that the IDC did not sound a strong warning note to the Board about the difficulty of the project nor question the Board's ability to undertake it.

4.46 As we indicated above, the Board has withheld the minutes of IDC meetings from the Committee and it is therefore not possible to ascertain the extent to which this question was raised. This summary which is meant to contain all 'significant' matters, has no reference to discussion of resource requirements to accomplish MANDATA. Either the warning was not raised or else the Board does not consider it to be significant.

4.47 We have been advised that at least one department - the then PMG's Department - did, through its IDC representative, raise the question of whether the Board had the capability to carry out the development. Telecom informed us that:

it was believed (by the then PMG's Department) and the Board had been advised, that the technical difficulties in the development of a system such as MANDATA (and by implication the associated costs) had been significantly underestimated.<sup>15</sup>

4.48 Apparently the warning was not taken seriously by the Board. As we described in Chapter 3, as soon as Telecom and Australia Post were formed as statutory authorities, they decided to withdraw from MANDATA.

4.49 The terms of reference of the IDC on ADP (Appendix 10) do not give a clear statement of the role and purpose of the IDC. They refer to 'co-ordination' but do not say to what end the co-ordination is to be directed. Since the IDC's responsibilities for achievement are not defined, it is impossible for this Committee or anyone else to judge whether the IDC has met its obligations.\*

\* The Committee recommended in its 174th Report that the IDC on ADP be made accountable for costs saved or benefits lost due to its operation.

43. Managing Director, Telecom Australia, letter to the Secretary, Joint Committee of Public Accounts, 19 July 1978.

4.50 Nevertheless, assuming that the summary of IDC discussions given to us by the Board is complete, we consider that the IDC was remiss in not raising and discussing as a principal issue the question of whether the Board had the resources and skills necessary to perform the project. It could be that the IDC itself did not realise the difficulties of the task or that the Board did not have the required special skills. Furthermore the relationship between the Public Service Board and the IDC on ADP was probably an inhibiting factor, particularly since the Board supplied the chairman for the IDC.

4.51 The Committee is giving consideration to alternative approaches to carrying out the functions at present performed by the IDC on ADP.

#### 4.52 Recommendation

*\*\* (14) When reviewing a department's proposal for a development project, the technical IDC should ensure that consideration has been given to the experience and number of personnel required to carry out such a task, whether the department has the resources, and if necessary, how the department's resources might be supplemented.*

#### PROJECT AND PROGRAMMING MANAGEMENT

4.53 To help in assessing the likelihood that future development of of MANDATA would meet time and cost schedules, the Committee asked to see samples of the following project documents:

- A. External Specifications
  - 1. Overall design objectives
  - 2. Definition of functional modules (eg leave updating and amending)
  - 3. Definition of tasks within functional modules (eg processing an application for leave.)
- B. Internal Specifications
  - 1. A sample design document which for a given module defines internal design such as data formats, timing requirements, memory space restrictions, etc.
- C. Time Schedules
  - 1. Manpower loading charts against time for representative tasks and modules.

2. PERT, CPS\* or dependency charts showing interrelationships between tasks against time for the whole project, and in greater detail for separate modules.

#### D. Project Documentation

- 1. Representative documentation of programming modules and tasks completed.
- 2. Progress charts showing work completed against plans, at several levels of detail, eg overall project, particular applications.

#### E. Quality Assurance

- 1. Definition of tests to which programming modules and tasks will be subjected when completed.
- 2. Documentation of results of tests already applied to previously completed modules and tasks.

4.54 The purpose in asking for these documents was to allow the Committee to assess the detail and thoroughness of planning and control, not to assess the product itself. Therefore only representative documents were requested.

4.55 The Board indicated that not all these documents were available but they would provide what they had. The Chairman of the Public Accounts Committee stressed that the Committee required examples of the types of documentation already in use, rather than documents which might be generated in response to the Committee's inquiry. Nevertheless it took the Board five weeks to meet the Committee's request.

4.56 By way of external documentation the Board supplied:

#### A Personnel/Leave Product Description

External Design Specifications for several modules, viz:

Commencement

Probationer recommendation

Personal particulars variation

Separation

Movement to another department

Prior service/long service leave details

Cancellation of prior service/long service leave

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\* PERT: Program Evaluation and Review Technique  
 CPS: Critical Path Scheduling

4.57 The Committee is satisfied that in general the above documents represent satisfactory documentation practice.

4.58 As examples of internal documentation (i.e. pertaining to program details), the Board supplied:

Design specifications for a population selection routine to extract designations and occupations from a data base.

Some task descriptions showing dates, staff assigned and dependencies.

4.59 The Committee considers that if these documents are typical of MANDATA internal design specifications, then this aspect of the project is satisfactory.

4.60 A few time schedules were supplied, as well as brief notes on project management procedures. These were extremely sketchy in nature. A network diagram of project activities dated 25 June 1978 related only to a limited number of program modules and lacked detail. Some information about staff allocations to tasks was provided but again this related only to a very limited number of tasks. No overall planning chart showing the whole MANDATA project was provided. No manpower loading charts showing staff numbers against time were supplied, nor did the Board supply progress charts showing work completed against plans.

4.61 Since no documents in the way of plans for the overall project, time schedules and manpower loading charts were supplied, the Committee can only assume that they do not exist.

4.62 This is an unsatisfactory state of affairs and does not give confidence that the management and administration of the overall project is being carried out with efficiency.

4.63 The Committee considers that the Board should give urgent consideration to the greater use of formal system development and project management tools. Several proprietary system development methodologies are available for purchase or license and experience with some of them has been excellent.<sup>29 30</sup>

4.64 Although it is possible for the Public Service to develop its own formal methodology for system development and documentation, the low cost of tested packages on the market makes it uneconomic to do so. Moreover it is unlikely that the results would be as satisfactory as the best of available commercial packages.

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29. *The Production of Better Software*, EDP Analyzer February 1979, 17(2).

30. Gunther, R.C., *Management Methodology for Software Product Engineering*, John Wiley & Sons, 1978.

#### 4.65 Recommendations

\*\* (15) *The Board should increase its use on this project of formal system development and project management techniques, particularly in the areas of documentation for management review and control.*

\*\* (10) *The Board should evaluate urgently available proprietary system development methodologies for use on the remainder of MANDATA development and on other projects.*

#### Should the Public Service Undertake Major System Development?

4.66 The development of large-scale software systems, of which MANDATA is an example, requires a number of specialized skills that are in short supply. People who are competent to perform the tasks of project management, product management, programming team management and similar leadership functions can command high salaries. Moreover they frequently wish to pursue careers in these specialized fields. Unfortunately the Public Service at present appears unable to offer either salaries which will attract and retain the most capable of these specialists or long term career opportunities for them in the management of computer system development.

4.67 The high rate of turn-over of staff, particularly senior staff, on the MANDATA project has doubtless been detrimental to the latter's progress. During the twelve month interval between the first and last public hearings of evidence on MANDATA by this Committee, there was a complete change of witnesses giving evidence, reflecting a total change in management of the project. One of the new witnesses has since left the project.

4.68 The Committee appreciates that this is a difficulty faced to some degree on most large computer system development projects which extend over several years. It has been suggested to us that to retain personnel on major projects like MANDATA, term contracts should be used, for example, a person joining the project would be required to sign an agreement to stay on the project for a minimum period of say, two years, with appropriate salary inducements.

4.69 Even this approach may not work in the present short supply situation. In our view the most effective way to attract and retain qualified people is to offer them the opportunity to work on well managed projects at industry competitive salaries.

4.70 The Committee believes that this is a recurring problem in many specialist situations in the Service and the Board should address itself to finding a solution.

4.71 This suggests that departments contemplating the development of large systems ought to look very carefully at whether they should use departmental staff for the purpose or should contract

as much as possible to organisations which are experienced in system development. There is obviously considerable advantage in contracting out system development to an experienced specialised commercial organization rather than attempting it in-house with less than fully competent practitioners. It may appear at first sight, when contractors' fees are compared with Public Service salaries, that in-house development is the cheaper approach. However, it must be recognised that system development management is a highly skilled function and that in the competitive market-place which exists, high fees are a reflection of the high level of competence and specialization required and the short supply position. The cost to the Commonwealth of poorly managed system development is very high.\*

4.72 The Committee can see as little justification for the Public Service developing its own major software products as for it building its own computing equipment. The difficulties of large-scale system software development are often underestimated by those (including experienced programmers) who have not previously attempted it.

4.73 Not only will the Commonwealth benefit directly through improved project performance by making use of specialized experienced personnel from the private sector, but in addition the greater use of such services may be expected to encourage the growth of the Australian software and computing services industry.

4.74 The Committee supports the view of the Australian Science and Technology Council which is:

The Australian software industry is not helped by the practice of government departments of purchasing relatively little locally produced software and their reluctance to make use of consultants... Commonwealth government departments (should) be encouraged to contract out programming and computing, to be carried out in Australia. <sup>41</sup>

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\* We have noted that delaying the completion of major projects such as MANDATA can cost over \$400 000 per month in lost benefits. By comparison the cost of engaging professional project management firms for major projects might be of the order of \$100 000 to \$200 000 per year. In this case an experienced system development firm would only need to reduce the implementation by a month or two to save its fees.

41. Australian Science and Technology Council, *Science and Technology in Australia 1977-78*, 1979.

#### 4.75 Recommendations

*\*(17) Department Heads should be aware of the many highly specialised aspects of system development, and the problems in recruiting and retaining fully qualified personnel. Careful consideration should be given to contracting the development project to a qualified commercial organisation, or if the development is to be done within the department, to obtaining specialist skills on contract to supplement or manage departmental staff.*

*\*\* (18) If it is necessary to develop a major system with departmental resources, a proven formal system development methodology should be used.*

*\* (18) Application packages and system programs should only be developed within the service if it can be shown that this approach is more cost-effective than obtaining (and possibly modifying) commercially available programs.*

CHAPTER 5

ESTIMATES OF COSTS AND BENEFITS

COSTS

5.1 When the Committee compared the cost estimates for MANDATA contained in the 1971 feasibility study with those made in 1977 by the external consultants it concluded that the Board had significantly underestimated the costs of MANDATA in its 1971 study. The Chairman of the Public Accounts Committee reported this to Parliament in May 1978, saying:

It would appear that the Public Service Board in 1971 greatly underestimated the costs of equipment, development\*, and operational<sup>†</sup> costs of MANDATA as well as the development time-scale required.<sup>5</sup>

5.2 The Public Service Board in its 1978 report disagreed with this conclusion and stated that it intended to put further evidence to the Committee. However, the evidence subsequently presented

\*"Development" as used here means the planning, designing, writing and implementation of programs for the MANDATA system (other than those programs purchased as standard products). This is a once-only activity which for MANDATA extends from 1976 to 1981.

†"Operational" means the on-going processes throughout the life of the system (ie to 1989 and beyond) of maintenance of equipment and programs, computer operation, data entry, and data communication. The cost of operations includes staff to operate and maintain the computers of the system, consumables such as electrical power, program maintenance and communication line rental.

2. Public Service Board, *MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System*, November 1971.
4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*, June/July 1977.
5. Connolly, David M., M.P., House of Representatives Hansard, 31 May 1978, pp 2811-2813.

by the Board to the Committee, while explaining some of the cost increases, tended to confirm the Committee's earlier conclusion. This may be seen from the following figures presented by the Board:

TABLE 1

	<u>\$ Thousands</u>		
	<u>1971</u>	<u>1977</u>	<u>Board's</u>
	<u>Estimate</u>	<u>Study</u>	<u>1978 Estimate</u>
Equipment & Software	6 152	10 591	9 854
Development	3 085	6 510	6 510
Operations (12 years)	<u>24 501</u>	<u>34 221</u>	<u>29 350</u>
	33 738	51 322	45 714

5.3 The above columns are comparable in that all are in 1977 dollars, staff cost estimates contain no overheads, and the costs of accommodating the PMG staff on the system have been removed from the 1971 estimate.

5.4 The Committee recognised that some of the increase was due to the fact that the 1971 estimate did not contain allowances for certain unforeseeable changes that had occurred between 1971 and 1977. These were exchange rate variations (affecting the price paid for imported equipment), contract rise-and-fall, items not for MANDATA (eg to allow the system to be used as a service bureau), Government decisions (eg the cost of interest on certain deferred payments), and changes in the methods of allocating certain costs.

5.5 If the Board's 1978 estimate is adjusted by a generous allowance for the effects of such extraneous factors, the 1971 estimate and the 1978 estimate may be compared as follows:

TABLE 2

	<u>\$ Thousands</u>		
	<u>(1977 dollars)</u>		
	<u>1971</u>	<u>1978</u>	<u>Percent</u>
	<u>Estimate</u>	<u>Estimate*</u>	<u>Increase</u>
Equipment & Software	6 152	8 002	30
Development	3 085	5 922	92
Operations (12 years)	<u>24 501</u>	<u>27 450</u>	<u>12</u>
	33 738	41 374	23

\* After removing allowance for unforeseeable items

5.6 The Board's own figures, even after allowing for inflation, movement in exchange rate and other factors, support the Committee's first conclusion regarding the 1971 estimate. Even so, the Chairman of the Public Service Board in June 1978 said:

I have been assured that the costs of the project have not increased significantly other than for external factors such as inflation, movement in exchange rate and changes in technology.<sup>16</sup>

5.7 It is now clear that in making this statement the Chairman of the Public Service Board was not using the 1971 figures as his base for reference. In September 1978, eleven months after the Board had been requested to submit all updates to the original estimate in detail, it revealed to the Committee that the Committee was not in possession of the cost estimates on which Cabinet in February 1974 gave approval to proceed with the development of MANDATA.

5.8 The Committee regards it as entirely unsatisfactory that the Board, despite a specific request for all estimates, delayed so long in producing the one estimate which would allow the Committee to evaluate the extent to which costs have risen above the estimates on which Government approval was based. A summary of the cost estimates accompanying the submission to Cabinet are given below in Table 3. These are shown before and after removing costs estimated by the Board to have originally been included to provide for use of MANDATA by Telecom and Australia Post.

5.9 Table 4 shows actual costs of MANDATA to June 1978 and to May 1979 as well as estimated cost to complete as at June 1978 and May 1979. June 1977 has been chosen as the base time to which estimates made at various times would be adjusted to allow comparison. This is the date of the most detailed estimates presented to us - those prepared by P.A. Consulting Services Pty Ltd.<sup>4</sup>

5.10 Comparison of the last column of Table 3 with the second last column of Table 2 (the 1978 estimate) shows that the 1978 estimate, after adjusting it for circumstances not reasonably foreseeable in 1974, is close to the estimate submitted to Cabinet after the latter has been adjusted for changes in money value, overheads and withdrawal of Telecom and Australia Post. Estimates of labour costs, and some other costs which are closely related to labour costs, for the year 1978/79, have been brought to equivalent costs at June 1977 by dividing them by 1.141. (See Appendix 11 for details.)

4. P.A. Consulting Services Pty Ltd Review of MANDATA, June/July 1977.

16. Chairman, Public Service Board, letter to the Chairman, Joint Committee of Public Accounts, 15 June 1978.

TABLE 3  
ESTIMATE OF MANDATA COSTS MADE  
AT DECEMBER 1973 AND LATER  
ADJUSTED FOR WITHDRAWAL  
OF TELECOM AND AUSTRALIA POST<sup>50,18</sup>  
(\$ THOUSANDS)

(See Appendix 11 for details)

	As Approved By Cabinet	Adjusted to 1977\$	100% Overhead on staff salaries removed	Allowance for Telecom/ Australia Post removed
Equipment and Software	7 630	7 896	7 896	6 696
Development	12 255	14 613	7 307	6 284
Operations (12 years)	45 761	50 347	34 585	28 126
TOTAL	65 646	72 856	49 788	41 106

TABLE 4  
COST-TO-DATE AND ESTIMATED COST-TO-COMplete  
AT JUNE 1978 AND MAY 1979  
(\$'000) - IN JUNE 1977\$

	June 1978 <sup>11</sup>		May 1979 <sup>51</sup>		Est Total
	Cost to	Est Further	Cost to	Est Further	
Equipment & Software	8 499	1 355	9 854	955	9 994
Development	3 475	3 035	6 510	2 240	6 510
Operations	2 923	26 427	29 350	23 535	29 137
TOTAL	14 897	30 817	45 714	26 730	45 640

11. Public Service Board, Submission to the Joint Committee of Public Accounts, 6 September 1978.
18. Public Service Board, submission to the Joint Committee of Public Accounts, 25 October 1978.
50. Public Service Board, Cabinet Submission on MANDATA, Attachment A, Table 1, February 1974.
51. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 25 June 1979.

BENEFITS

5.11 The Board was asked to provide to the Committee "the original cost-benefit analysis and any further updating which has taken place since then in detail".<sup>1</sup> In response, the Board provided summary cost and benefits estimates from the report<sup>2</sup> prepared by P.A. Consulting Services Pty Ltd in 1977. The Board said that this was "the most recent comprehensive updating".<sup>3</sup> The Committee then asked the Board for the full report by the consultants, to allow an assessment to be made of the assumptions and reasoning leading to the estimates of costs and benefits. The Board at first declined to show the report to the Committee. However following a statement in Parliament by the Chairman of the Public Accounts Committee and a request to the Prime Minister, the Board provided the Committee with a copy of the report.<sup>5-5<sup>b</sup></sup> A summary table of benefits from the P.A. report is included in Appendix 11-D. In summary the cumulative value of savings and the cumulative 'present' value (actual value at June 1977, using a 10 per cent per annum discount rate) over time are shown in Table 5.<sup>4</sup>

5.12 In view of the delays in the project due to staff shortages and other factors, to changes in product specification and to changes in the development plans, it is now doubtful that the full benefits estimated by the consultants can be achieved. We therefore consider that the 1977 benefit estimates should be reviewed and if necessary revised, taking account of these changed factors.

5.13 The Board has recently recalculated the total cost and the cost-to-complete of MANDATA and has arrived at a figure considerably lower than that estimated by P.A. in 1977, as shown for example in Table 6. In this Table operating costs are taken over twelve years (to 1986-87) the cost estimates are expressed in 1977 dollars, and staff overheads are included.

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.
3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.
4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*, June/July 1977.
5. Connolly, David M., M.P., House of Representatives Hansard, 31 May 1978, pp 2811-2813.
56. Chairman, Joint Committee of Public Accounts, letters to the Prime Minister, 5 May 1978 and 25 May 1978.

TABLE 5

ESTIMATES OF CUMULATIVE VALUE OF SAVINGS AND CUMULATIVE PRESENT VALUE OF SAVINGS (AT JUNE 1977; 10% DISCOUNT RATE)

	(\$'000)	
	Cumulative Savings	Cumulative Present Value
1976/77	58	58
1977/78	595	546
1978/79	1 599	1 375
1979/80	9 763	7 506
1980/81	29 851	21 226
1981/82	52 324	35 182
1982/83	80 697	51 184
1983/84	109 070	65 739
1984/85	137 443	78 989
1985/86	165 816	91 019
1986/87	194 189	101 971
1987/88	222 562	111 901
1988/89	254 935	122 228
1989/90	283 308	130 465

TABLE 6

MANDATA PROJECT COST (\$'000)

	P.A. Estimate June 1977	FSB Estimate June 1979 (100% overhead on staff)
Equipment and Software	11 591	9 993
Development and implementation	13 020	13 020
Operation	58 248	43 279
SUB TOTAL	82 859	66 292
Contingency	6 962	0
	89 821	66 292

5.14 Because cost estimates have been reduced since 1977 and savings estimates remain unchanged, the estimated benefit/cost ratio and net present value of the project are currently higher than the figures calculated by the consultants in 1977. If estimates of these parameters were favourable to the project then, they are more so now.

5.15 If current estimates of costs and savings are correct the project is unquestionably highly cost/effective. What is needed now is a re-validation of the estimated costs and savings to provide an accurate basis for recalculating the net value of the project. The latter should be used as an overall target for project savings and the Board and users should commit themselves to the relevant departmental components of the total as we have stated in Recommendation No 11.

5.16 We therefore recommend that:

\*\* (10) *The Board should without delay prepare up-to-date detailed estimates of the expected savings and other benefits from MANDATA.*

#### COST EFFECTIVENESS ANALYSIS

##### Public Service Board Guidelines

5.17 The Public Service Board has issued, as ADP Information Manual No. 2, guidelines for cost-effectiveness analysis of ADP systems.<sup>20</sup> The Committee considers this to be an important forward step which should contribute to a consistent approach to the assessment of costs and benefits of computer projects. Intelligent application of the guidelines can be expected to improve the accuracy of estimation of project cost-effectiveness, which in turn should lead to more soundly-based selection of optimum approaches. Moreover, the degree of detail and the method of presentation advocated will assist in management review of projects during and after development.

5.18 The Board makes the distinction in the guidelines between cost-effectiveness analysis and the broader sphere of cost-benefit analysis of computer projects:

A cost-effectiveness analysis is a method of establishing a cost comparison between a number of alternative means of indicating a predetermined activity... The use of the technique in this context differs from a more comprehensive benefit/cost analysis in that the value of the output of the activity is not normally assessed. (Public Accounts Committee's emphasis).

The object of the analysis is to establish the least net cost alternative of achieving a predetermined objective rather than determining the most productive allocation of resources in an environment of competing demands...

20. Public Service Board, *A Guide to Cost-Effectiveness Analysis of ADP Systems* (ADP Information Manual No. 2), Canberra 1978.

The guide assumes that competing functions have already been subjected to broad analysis at high level covering the overall costs and benefits... It has also been assumed that a decision has been reached by the competent authority (for example, Cabinet, the Minister, etc.) that a particular function or activity is to be undertaken.

5.19 The distinction being drawn above is the well known one between 'doing things right' and 'doing the right things'. The Board guidelines attack the former problem. We are concerned however that the broader context of decision-making about computing in the Service may not normally be subject to the same level of rational analysis. We should like to see an equivalent set of guidelines produced for the wider sphere of cost-benefit analysis of computer projects to help ensure that the right objectives are chosen and costs in the wider social context are taken into account. Those responsible for decision making about ADP projects in this wider sphere should be aware that the Board's cost-effectiveness analysis starts with the assumption that the right function or activity has already been selected to be done.

#### Extensions to Guidelines

5.20 We consider that in some respects the Board's guidelines should be expanded, particularly as to the way costs and benefits which are not accurately predictable are dealt with. This is a difficult area in which consistency of approach and interpretation is important. The assumptions used in risk assessment are easily covered up unintentionally; therefore advice as to standard approaches and method of documenting assumptions should be included in the guidelines. (For examples of possible approaches see *The Economics of Computers*.<sup>25</sup>)

#### Effectiveness Evaluation of Installed Systems

5.21 A set of guidelines for a consistent approach to measuring the performance and effectiveness of computer systems once they have been installed is still lacking. Only in 1976 did the Public Service Board begin to carry out reviews of the operational effectiveness, technical performance, and achievement of objectives of departments' computer systems. The reason given by the Board for not providing earlier a formal consistent approach to cost-effectiveness analysis and post-implementation reviews was lack of resources within the ADP Division of the Board. We consider that the Board should give high priority to establishing guidelines and procedures for carrying out system performance reviews.

25. Sharpe, W.F., *The Economics of Computers*, Columbia University Press, New York, 1969.

### Criteria for Cost-Effectiveness

5.22 A witness for the Board said that no minimum acceptable criterion of cost-effectiveness had been adopted within the Service as there could be intangibles present which should be taken into account in deciding on the acceptability of a project.<sup>1</sup> The Committee agrees with this latter statement but believes that often, so-called 'intangibles' are not really intangible but are regarded as such because they are either difficult to estimate or subject to uncertainty, or both. Every effort should be made to assign monetary values to these difficult-to-estimate factors. Because a residue of genuinely intangible factors may remain, we accept that there is no single benefit/cost ratio, net-present-value, or other simple criterion which alone can be used as the standard of acceptability in all circumstances. Nevertheless for consistency of approach it is desirable that some guidelines for acceptability be prepared, encompassing if necessary several criteria. Zones of acceptability could be defined in terms of net-present-value benefit/cost ratio, risk, capital requirements, the impact of resource demands on other projects and similar factors.

#### Recommendations

5.23 The Committee therefore recommends that:

- \*\* (20) *The Public Service Board should give consideration to extending its guidelines for determining the economics of computer system proposals to include methods for the assessment of:*
- . *risk*
  - . *impact on other projects*
  - . *capacity and capability of the department to carry out the project.*
- <sup>1</sup> (21) *The Board should supplement its guidelines on cost-effectiveness analysis with similar guidelines on the assessment of the effectiveness of computer systems in operation.*
- \*\* (22) *The Public Service Board or the Department of Finance should prepare and publish guidelines to assist Permanent Heads in the rational and consistent analysis of benefits and costs of proposed large scale computer projects (e.g. for presentation to Ministers), taking into account:*
- . *the extent to which the project contributes to the policy of the Government of the day*
  - . *the costs and benefits, social and otherwise, of the project*
  - . *the impact on alternative projects*
  - . *the impact on personnel and organisations with the Public Service.*

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.

### Method of Accounting for Jobs Eliminated by the Computer

5.24 While endorsing the goal of increased productivity and effectiveness in the Public Service through the use of computers, the Committee considers that possible side effects such as unemployment cannot be ignored.

5.25 In the cost-effectiveness analyses of MANDATA, savings from jobs eliminated by the computer have been treated as 'benefits' and valued at the wages saved plus overheads. No account has been taken of possible unemployment effects associated with estimated staff savings. This approach is consistent with the recommendations in the Board's publication 'Guide to Cost-Effectiveness Analysis of ADP Systems' much of which is based on a document produced in 1966 by the Treasury.<sup>19 21</sup>

5.26 The latter document states that:

...unlike the firm, the public agency needs also to take into account, so far as practicable, any interdependence between its project and activity in the economy as a whole...

5.27 The statement from Treasury unfortunately gave no guidance on the approach to be taken in assessing savings resulting from personnel displacement in a period of unemployment such as the present.

5.28 Possibly because it contains the same underlying assumption of full employment, the Board's 'Guide to Cost-Effectiveness Analysis of ADP Systems' makes no mention of the cost of increased unemployment resulting from the introduction of a computer. In fact the Board implies that the determination of the costs of major external effects of computer systems is outside the scope of the guide:

The perspective of the technique as applied in this guide is one of viewing the public sector as an enterprise requiring cost-effective management. Thus the particular approach adopted is not necessarily the same as in a traditional social cost effectiveness analysis. The adoption of the above criteria influences the assessment of additional costs and benefits.

5.29 The Committee believes that within the Service, probably in the Board, responsibility should be taken for an analysis that does take into account ramifications beyond the Department acquiring the computer.

20. Public Service Board, *A Guide to Cost-Effectiveness Analysis of ADP Systems* (ADP Information Manual No. 2), Canberra 1978.
21. Commonwealth Treasury, *Investment Analysis*, supplement to the Treasury Information Bulletin, July 1966.

Recommendations:

5.30 We recommend that:

- \*\* (23) *Submissions to Cabinet on large computer projects should make clear all the expected or planned effects including:*
- . *staff redeployment*
  - . *effect on size of the Public Service*
  - . *effect on unemployment levels*
  - . *retraining costs*
  - . *other significant effects not accounted for in the acquiring department's cost-effectiveness analysis.*

CHAPTER 6

THE AUDITOR-GENERAL'S REPORTS

6.1 Aspects of MANDATA raised in the Auditor-General's Reports for 1975-76, 1976-77 and 1977-78 are:

- Accommodation for ADP equipment
- Contracts for the supply of equipment
- Special purpose software
- Utilization of central computer installation
- Project slippage
- Development of remote sites
- Utilization of equipment remote from the central computer installation

6.2 The Committee notes that the Auditor-General has raised further aspects of the project in his report for 1978-79. We will review these aspects when, as noted elsewhere, we next review MANDATA. Our findings and observations on the matters listed above follow.

ACCOMMODATION OF ADP EQUIPMENT

Central Computer Unit

6.3 In mid-1972 the Public Service Board requested space for its proposed computer. It took until September 1975 - only a few months before delivery of the computer - to reach agreement on an interim site for the computer; it took *five and a half years* to reach the firm decision that the computer would be permanently located on that site.

6.4 We list below some of the factors which appear to have contributed in various measures to this extraordinary state of affairs:

1. The Public Service Board was unable for a long period to specify firmly its site requirements.
2. The Department of Administrative Services had reserved the site finally occupied by MANDATA for the proposed computer for the Department of Overseas Trade. This space was not made available for use as the MANDATA site until September 1975, only a few months before delivery of the computer.
3. When the computer was installed and started operation it was found that there had been an error in the installation or design of air-conditioning and this required further work on the site. As a result formal acceptance of the site by the Public Service Board did not take place until four months after delivery of the computer.

4. The Department of Administrative Services for a long period favoured the use of an area in Stage 2 of the Trade Group Offices for the Board's computer. This was not a satisfactory site for a large computer. Power and air-conditioning were restricted, floor-to-ceiling height was insufficient, and the space was too small.
5. The NCDC has informed us that its practice is to make no provision for computer space in planning and designing new buildings in Canberra unless a definite requirement by a nominated occupant is known to exist, or "if" the building complex provides very large office space and it is reasonable to expect that a future occupant will require major computer space."<sup>4</sup>

Specification of Requirements

6.5 In September 1972 the Board stated its space requirements for hardware and ancillary services to be 3,300 sq ft initially, growing to 5,000 sq ft by 1976.<sup>5</sup> By April 1973 its estimate of initial requirements had grown to 4,700 sq ft. By August 1973 the space estimate was 6,080 sq ft and by mid-1975 it was 9,965 sq ft.

6.6 Power and air-conditioning requirements estimates also grew considerably between mid-1973 and mid-1975. The following figures were given to the NCDC by the Public Service Board in August 1973 and mid-1975.

TABLE 7  
Site Specification

	<u>At August '73</u>	<u>In mid-'75</u>	<u>% Increase</u>
AREA (sq ft)	6080	9965	64
POWER (kva)	175	461	163
HEAT (btu/hr)	481000	1168446	143
WEIGHT (lb)	73500	85794	17
AIR (cu ft/min)	34200	49860	46

6.7 The Board informed the Committee that:

the difficulty in accurately specifying requirements for the computer centre arose almost exclusively from the fact that the make and model of the computer mainframe, and the associated peripheral configuration, were not known until a comparatively late stage in the site planning. The general

3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.
49. Secretary and Manager, National Capital Development Commission, letter to the Secretary, Joint Committee of Public Accounts, 4 May 1979.

scale of the equipment to be procured was known from an early stage, and this permitted site planning to proceed satisfactorily to a certain point. However, the environmental requirements of different makes and models of computer can vary significantly, particularly in relation to airconditioning specifications, and until a decision is reached on a particular computer to be purchased it is not possible to specify detailed requirements with confidence.<sup>3</sup>

6.8 It is normal practice, when site requirements cannot be specified before the computer has been selected, to allow within reason for the worst case conditions. The Public Service Board attempted to do this in its August 1973 draft specification for site requirements; it allowed for the largest floor area, air conditioning and power supply required by any of the potential suppliers of the MANDATA system.<sup>19</sup> The Committee therefore does not accept that the understatement of requirements was an unavoidable error based on not knowing who the final supplier would be.

6.9 We think that the problem was more with the Board's poor planning of its requirements and its lack of understanding of good site development practice.

6.10 In evidence to the Committee, an officer of the Board said:

In the very early stages some of the ramifications such as the need for highly specialised air conditioning were not fully understood by either the practitioners or the constructing authorities. As soon as we became aware of these things - I think it goes back to about 1972 when we really started to understand the real need - that was probably the point I think when we really started to take up the matter with the relevant Commonwealth authorities.

6.11 In light of the above we consider that the Board in its early design of the MANDATA system had very little idea of how to estimate accurately the power, space and air conditioning requirements, even given a firm configuration. In such circumstances the advice of specialists in computer site development should be sought - if necessary from outside the Public Service (see Recommendation No. 26).

3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.
19. Public Service Board, "MANDATA System - Site Requirements for Central Computer Installation", Draft Specification, August 1973.
1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector, Stage 1*, Minutes of Evidence, 1978.

### Auxiliary Power Supply

6.12 In addition to the growth of space and power estimates arising from the growth of the equipment configuration, there was a further significant factor in the choice of a site, This was the late decision that an 'uninterrupted power supply' was required (i.e. batteries as back-up for short-term failure of external power supply and auxiliary generators for longer failures). This requirement had nothing whatever to do with the make or size of computing equipment to be bought. It cannot therefore be said that the requirement was not specified sooner because the actual supplier of the central computer unit was not known. When the requirement was specified to the constructing authority in September 1974 it significantly affected the choice of a site.

6.13 Based on technical advice which we have received, we question whether an auxiliary power supply for long-term power failures was really necessary, considering the nature of MANDATA. In due course the Board evidently came to the same conclusion since neither auxiliary generators nor battery backup were ever installed.

6.14 The Public Service Board's guidelines on cost-effectiveness analysis provide a checklist of capital equipment items that should be taken into account when estimating costs.<sup>20</sup> This list includes the cost to construct new buildings and the cost to alter existing buildings to house equipment. Clearly the costs associated with uninterrupted power supply should also be included in the cost-effectiveness analysis, and since these costs are sometimes overlooked in the early stages of system planning, we suggest that they should be explicitly stated in the checklist of capital costs in the Board's guidelines.

### 6.14 Recommendations

*\*\* (24) The question of whether uninterrupted power supply is required should be resolved before a proposal is made to the IDC and the costs of providing uninterrupted service should be included in the cost estimates when the proposal is submitted to the IDC for endorsement.*

*(25) The Board's guidelines for cost-effectiveness analysis should include the reminder that the cost of uninterrupted power supply should be included in the estimate of capital costs.*

### Lack of Co-ordination

6.16 The record of discussions between the Public Service Board, the then Department of the Interior, the National Capital Development Commission, the Department of Services and Property

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20. Public Service Board, *A Guide to Cost-Effectiveness Analysis of ADP Systems* (ADP Information Manual No. 2), Canberra 1978.

and the Department of Housing and Construction points to lack of co-ordination and poor overall management of site planning for MANDATA. In our view the Public Service Board as the client department must carry the major responsibility for these deficiencies. We consider that since the Board lacked experience of site development it should have obtained the services of an experienced site planning engineer to advise and represent it. While the Board could not be expected to recognize this at the time, we consider that the IDC on ADP should have done so and advised the Board accordingly.

6.17 The inability of the Public Service Board to identify quickly and accurately its site requirements resulted in a great deal of unproductive work by the Board, the Department of Housing and Construction, and the National Capital Development Commission. The full magnitude of this cost is not known, but one component of it - work carried out in planning accommodation at Anzac Park West which was subsequently abandoned - is estimated by the NCDC to be approximately \$60 000. The Committee considers that new approaches are required in the planning and development of computer sites in the Public Service, and recommends that:

*\*(26) From early planning through to acceptance, departments acquiring major computer systems should obtain the services (not necessarily full-time) of a well qualified and experienced computer site planning engineer whose responsibilities should include planning site requirements, estimating costs, co-ordinating contractors, testing site readiness and correct installation of services before delivery of the computer, and acceptance of the site.*

*(27) If this person cannot be obtained from within the Service, a qualified consultant should be engaged.*

*\*(28) Since inexperienced departments may not recognise the importance of this function or their incapacity to do the job themselves, the IDC should for the time being be responsible for advising the department of the need for the function and how to obtain the necessary skills.*

### Delay in Acceptance

6.18 The fact that a wholly suitable site did not exist for MANDATA at the date of delivery led to a delay in acceptance from the manufacturer estimated by the Public Service Board to be 135 days.<sup>13</sup> Unproductive costs of \$38 000 per month for interest and maintenance charges occurred during this period.<sup>7</sup>

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7. Report of the Auditor-General 1975-76. Parl. Paper No. 225/1976.

13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

6.19 The Committee has previously estimated the cost of deferment of starting MANDATA to be \$440 000 per month, equivalent to \$14 470 per day.<sup>39</sup> Thus a delay of 135 days would have resulted in a loss of benefits equal to \$1.95 million if all progress in development had ceased during this period. However the Board has informed the Committee that "essential development work for MANDATA proceeded during the period concerned, utilizing facilities at the Burroughs Data Centre, Fyshwick, without incurring processing costs additional to those already committed under the existing contract ATB18251, in relation to provision of Data Centre Services".<sup>40</sup>

6.20 It was fortuitous that alternative arrangements could be made in this case for development work to proceed. Frequently such alternative arrangements cannot be made and a four month delay in acceptance such as occurred here would in general involve heavy costs to the Government because of the consequent delay in the realization of benefits from the project.

#### 6.21 Recommendation

<sup>41</sup>(29) *The National Capital Development Commission (NCDC) and the Department of Housing and Construction should note that delay in starting major projects can entail heavy costs and should take into account the magnitude of such costs in their efforts to ensure that site preparation is complete and correct by the scheduled delivery date. Officers should be accountable for delays.*

#### Planning for Computer Accommodation

6.22 Although the area now occupied by the MANDATA system in the basement of the Trade Group Offices was designed originally as a computer room, it was not designed to accommodate such a large system as MANDATA. Consequently more than \$700 000 had to be spent to make it suitable as a permanent site for MANDATA. This cost was for upgrading electrical, air-conditioning and fire protection services; for partitioning and security; and for increased stand-by chiller capacity. The National Capital Development Commission said:

The Public Service Board MANDATA computer is a typical example of a computer being forced into a building.<sup>42</sup>

13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.
39. Joint Committee of Public Accounts 174th Report, *Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service*, Canberra 1978. Parl. Paper No. 341/1978.
44. Secretary and Manager, National Capital Development Commission, letter to the Inter-Departmental Committee on ADP, 21 August 1974.

6.23 The NCDC also cited:

...the MANDATA project is indicative of a general situation where approvals are apparently given for the purchase of computer equipment without adequate recognition of the accommodation requirements in terms of space, or the time and cost involved in preparing the space.<sup>7</sup>

6.24 In a letter to the IDC on ADP, the NCDC referred also to:

...computers for Treasury, Taxation and Social Security where equipment was ordered without any recognition of building costs and where impossible times were set for builders because of lack of forward planning and communication by the departments involved.<sup>44</sup>

6.25 The NCDC suggested a partial solution to this problem in the following words:

The Commission...believes that more communication and co-ordination are essential if these projects are to proceed in a more systematic and economic way than in the past. Two suggestions emerge, viz:

- a. Your Committee (i.e. the IDC on ADP) seek formal advice with any computer submission showing the arrangements made with the Department of Services and Property for its accommodation and the (National Capital Development) Commission's comments on feasibility and funding when related to Australian Government buildings; and
- b. When your Committee accepts an initial bid, a copy of the advice be automatically passed to the Department of Services and Property and the Commission.

6.26 Apparently these suggestions had little effect on the IDC because two months later the NCDC again had cause to write to the IDC with a strong complaint:

The Australian Bureau of Statistics has written to the Commission with a request that modifications be made to the computer centre as site preparation work to accommodate changes in computer equipment at the Cameron Offices. The Bureau refers to a decision by your Committee of 14 October 1974 giving approval for the project to proceed and asks that building work be completed 13 December 1974. The

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7. Report of the Auditor-General 1975-76. Parl. Paper No. 225/1976
  44. Secretary and Manager, National Capital Development Commission, letter to the Inter-Departmental Committee on ADP, 21 August 1974.

*request is the first and only advice to the Commission of the need for the work. (Public Accounts Committee's emphasis).<sup>45</sup>*

6.27 The NCDC also complained that it had received nothing more than an acknowledgement to its letter of two months earlier.

6.28 The Public Accounts Committee strongly supports the general contention by the NCDC that there should be better planning and co-ordination of site development, particularly by the IDC on ADP. However there are serious difficulties attached to the proposition that the IDC should withhold its endorsement of departmental proposals for system acquisition unless firm arrangements have been made for housing the equipment. We have frequently referred to the fact that the cost of deferring major computer projects can be very high. At present the time taken to find a suitable site for a proposed computer system appears to be considerably longer than the time required to obtain delivery of the computer. In our view, therefore, planning of facilities requirements by the departments concerned and by the NCDC and the Department of Services and Property must take place well before the submission of a proposal to the IDC for the acquisition of equipment if the project is not to be delayed for lack of suitable accommodation.

6.29 The Committee is most concerned at the prospect that highly cost-effective computer projects might be delayed because of inability to forecast future facilities requirements. Because of this concern the Committee asked the NCDC the following questions:

Q Is it the practice of the NCDC to provide for computer accommodation in new buildings at the design stage?

A Not unless the building is designed for a specific, nominated occupant who will be installing a major computer, or the building complex provides very large general office space and it is reasonable to expect that a future occupant will require major computer space.

Q When this is done is the space allocated to a department at the time or is it regarded as a pool of space to be allocated later to departments as and when they receive government approval for their computer proposals?

A See above. In the latter situation the computer area is a pool available for allocation by DAS. (Department of Administrative Services).

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45. Secretary and Manager, National Capital Development Commission, letter to the Inter-Departmental Committee on ADP, 28 October 1974.

Q How does the NCDC decide on the size, power supply requirements, air conditioning requirements and other environmental aspects in the absence of firm specifications from client departments?

A Based on experience but to avoid costly over-provisions, services to broad computer standards are incorporated and modified at a later time when the computer space is allocated and specific requirements are known.

6.30 The future demand for large computer rooms is a function not only of the growth of computer use within departments but also of the size and distribution of future computing hardware. There is a trend at the moment towards more widely distributed processing power and, even in the case of centralised processing, there is a trend towards distributing peripherals such as printers to users' premises. Both these trends can be expected to reduce the growth in demand for large central computer rooms.

6.31 However, it is our opinion that at some time during the life of all new office buildings in Canberra, there is a high probability of a requirement for the installation of at least one medium to large-scale computer. To ignore this completely in the design of a new building will mean that later alterations to make the site suitable for a computer will be very expensive. On the other hand, we recognize that to design every new building to accommodate the largest computers available would also be uneconomic.

6.32 Clearly the NCDC is not in a position to make sound decisions on what provision to make for computers in new buildings without knowledge of long term departmental plans for ADP development, at least in aggregate. The ADP resource planning now being carried out by the Public Service Board on the basis of annual returns from departments, could provide the data required by the NCDC to make rational decisions for or against the provision of computer facilities in each new building and the amount of space to be allowed. While the present forms used for departmental returns do not require forecasts of the amount and distribution of space requirements they should be modified to do so.

#### 6.33 Recommendations

*\*(30) Departments in making returns to the Board for the purpose of ADP resource planning should include forecasts of requirements for computer room space.*

*\*(31) The Board should establish suitable procedures to ensure that forecasts are obtained from departments, aggregated into a suitable format, communicated to the NCDC and the Department of Administrative Services and incorporated in new building plans to ensure that computer projects which have been correctly forecast by departments with sufficient notice are not delayed for want of space or other facilities.*

\*(32) When submitting proposals for computer systems to the IDC on ADP departments should be required to include details of the arrangements made with the Department of Administrative Services for computer accommodation, with comments on feasibility and funding if such arrangements involve Australian Government buildings.

\*(33) The IDC on ADP should keep the NCDC and the Department of Administrative Services fully and promptly informed of its endorsement or otherwise of such proposals, and of any factors known to it which may change the facilities requirements previously communicated to these bodies.

CONTRACTS FOR THE SUPPLY OF EQUIPMENT

6.34 The Auditor-General was critical of the fact that contracts for the supply of equipment were signed well after the equipment had been delivered.<sup>7</sup> The Public Service Board supplied the Committee with the following details.<sup>3-13</sup>

TABLE 8

Supplier	Contract No.	Approx. Value For \$000's as per Contract*		Date First Delivery	Date Contract Signed
BURROUGHS	ATB18200	3180	Central Computer Unit	Feb 1976	1.7.76
NCR	ATB18280	1810	Minicomputer Units	28.1.76	30.6.76
NCR	ATB18283	624	Data-Concentrator-Units	18.12.75	30.6.76
AWA	ATB18260	1697	Visual Display Units	17.6.76	10.9.76
Warburton Franki	ATB18834	526	Terminal Printer Units	3.2.77	25.2.77

Note: In each case equipment was delivered before the contract was signed; in the case of Burroughs and NCR equipment, deliveries were five and seven months before contract. Most of the minicomputer units were not put into service until twelve to eighteen months after delivery and most of the data-concentrator-units were never put into service at all.

- \* This is not necessarily the amount actually paid for the equipment, due to exchange rates variations and modifications to requirements.
- 3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.
- 7. Report of the Auditor-General 1975-76. Parl. Paper No. 225/1976.
- 13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

6.35 The Public Service Board contended that although a large measure of formal and binding agreement with the contractors existed, the absence of formalised agreements could not be shown to have compromised the Government's position in dealing with the contractors.<sup>13</sup>

6.36 If, as this implies, the contracts were only the formal bringing together in one document of all the matters already agreed upon and binding on the contractors, then we can see no reason why they should have taken so long to sign.

6.37 The Committee recognizes that even a letter of intent unavoidably implies a level of commitment which somewhat reduces the strength of the Government's bargaining position. We also recognize that a point is reached in contract negotiation when the potential gains from prolonging negotiation are outweighed by the certain loss due to further delays in starting the project. Nevertheless, in general, the Commonwealth's position must be prejudiced if before contract negotiations are complete the contractor becomes aware that the Commonwealth will not back out.

6.38 Recommendation

\*(34) In order that the Commonwealth may retain maximum negotiating strength in the procurement of major items of computing equipment or services, it should not take delivery or allow the services to commence until a formal agreement has been executed.

SPECIAL PURPOSE SOFTWARE

6.39 In addition to standard software supplied with the computers, some special software, described below, was written for MANDATA by Burroughs and NCR.

Minicomputer Units (MCU's) and Data-concentrator-units (DCU's)

6.40 A contract was entered into with NCR in 1976 for special software for the minicomputer units and data-concentrator-units. The contract price of this was approximately \$104 000 for the DCU's and \$286 000 for the MCU's.

6.41 The software for the minicomputer units was mainly to provide capabilities for data validation and editing, and for control of data transmission to and from the terminals and the central computer unit (via data-concentrator-units). The software for the data-concentrator-units was primarily to provide data switching between groups of minicomputers and the central computer unit. When the decision was made to abandon the use of the DCU's, the software for them was cancelled before any programming work had begun, the cost to that time being \$7403 for preliminary investigation by NCR.

- 13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

### Central Computer Unit

6.42 The major special software items from Burroughs were an operating system module called the Processing Framework and an Interrogation System. The contract price was approximately \$350 000.

6.43 The primary purpose of the Processing Framework was to control the flow of batches through the system from their initial input to their processing by application programs and the returning of output information. Computer Sciences of Australia in their 1972 report said:

With the development of modern systems software, the functions of the "processing framework" are obtainable from currently available systems, including most, if not all, of the system's security features required. The implementation of the "framework" as described in the documents referenced should therefore not be pursued.<sup>17</sup>

6.44 This recommendation was not adopted by the Board, presumably because the required software was not available at that time as a standard product from the vendor of the central computer.

### UTILIZATION OF THE CENTRAL COMPUTER INSTALLATION

6.45 In his 1975-76 report the Auditor-General pointed out that because of the deferment of the implementation date for MANDATA, concern had been expressed that computer equipment could be under-utilized. As a result of this the Board came to an arrangement with the Departments of the Capital Territory and Immigration and Ethnic Affairs for them to use the central computer unit for their data processing requirements. This was an unfortunate decision. The work build-up of these departments and of MANDATA was such that the system rapidly became over-loaded, thereby impeding system development. As a result the departments, which we understand had not been entirely happy about going on to MANDATA in the first place, were asked to make other arrangements for their future processing. The inability of the Board correctly to forecast its requirements for machine time for development has no doubt had a disruptive effect not only on the project itself but also on the departments who were briefly in and then out of the system.

6.46 The Board originally estimated that the saving to Government of moving DCT and DIEA on to MANDATA would be \$1.355 million (the payment saved in bureau charges less the lease cost of additional equipment for MANDATA to accommodate the two additional users).

17. Computer Sciences of Australia Pty Ltd, *MANDATA - Review and Recommendations*, report to the Public Service Board, October 1972.

The later decision leading to early removal of DCT production will, according to the Board, reduce the saving to \$397 000. However additional costs will partially or wholly offset such savings. The Auditor-General has reported that:

the transfer to alternative processing equipment and changes to systems specifications has resulted in identifiable additional costs of approximately \$40 000 per annum, a duplication of communication lines and as yet unquantified costs in respect of system and program changes necessary to permit operation.<sup>9</sup>

6.47 The Committee is concerned at the cost of disruption to the MANDATA project which occurred through inability of programmers to obtain machine time for development work. The magnitude of this cost is at present unknown. As we have pointed out, if the estimate of benefits for MANDATA are realistic, delays to project development and implementation are very expensive. We therefore recommend that:

*<sup>4(35)</sup> Diversion of resources from the project should only be done with full recognition of the impact on project progress and following careful analysis of the costs and benefits of resource diversion, taking into account the cost of delaying implementation of the remainder of MANDATA.*

### Background to the Use of MANDATA as a Bureau

6.48 In October 1972 the Department of the Interior entered into an arrangement with Burroughs Limited for the hire of computer time on Burroughs' B6700 installation at Fyshwick. The contract provided for the use of a minimum of 2000 hours of computer time over a two-year period and also permitted other departments to use the computer subject to agreement between Interior and Burroughs.

6.49 In December 1973 a new contract was negotiated between the Australian Government Stores Supply and Tender Board and Burroughs Ltd with the Public Service Board named as principal on behalf of four user departments - Capital Territory, Services and Property, Immigration and Overseas Trade. The facility was to be operated as a bureau under the control of a senior Board officer acting as co-ordinator and a management committee consisting of the Co-ordinator and the ADP directors of the participating departments. Burroughs Ltd supplied operational and software support staff.

6.50 In late 1974 the Attorney-General's Department began to use the system. In April 1975 a further contract was negotiated with Burroughs for use of the facility until December 1976. The cost

9. Report of the Auditor-General 1977-78. Parl. Paper No. 221/1978

had been increasing at a rapid rate and the new contract contained more favourable terms for the Government particularly as to the pricing of the service.

6.51 During 1976 an examination of the existing and forecast workloads of user departments revealed that the existing installation was "unlikely to be able to cope with the projected demand much beyond the short term".<sup>23</sup> Three options were considered to be available. One was the continued use of external service bureaux, in particular extending the number of hours per day used on the Burroughs bureau and consequently the payments to Burroughs. The second alternative was to transfer some of the work being done on the bureau to existing and proposed APS installations. The third alternative considered was the establishment of Public Service in-house facilities. In the end, a recommendation was put to and accepted by the IDC that the workloads of the Departments of the Capital Territory and Immigration and Ethnic Affairs should be transferred to the MANDATA computer. According to the Board each of these departments was in agreement with the proposed redistribution of the workloads. Ironically, a reason for selecting the Department of the Capital Territory as one of the departments to be moved was that the MANDATA system was supposed to provide DCT with "a better prospect of uninterrupted service for the on-line, over-the-counter, services required (for its motor vehicle registration application)".<sup>24</sup>

6.52 The Public Service Board has informed us that the agreement to provide service bureau facilities to Capital Territory and Immigration and Ethnic Affairs on the MANDATA computer was arranged to operate for the calendar years 1977, 1978 and 1979. However, on the 26th June 1978, only a month or two after DCT had completed the transfer of its application to the MANDATA machine, that Department was informed that it should make alternative processing arrangements to avoid affecting the progress of the MANDATA system.\*

6.53 The Auditor-General's Report for 1977-78 states that:

although an agreement had been effected whereby the Public Service Board would service the data processing requirements of the Department up until December 1979, the Board advised the Department in late June 1978 the MANDATA computer should be cleared of non-MANDATA work as quickly as possible after allowing reasonable time to make other arrangements.

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- \* The Public Service Board says that all Capital Territory work was effectively transferred by April 1978, whereas the Department of the Capital Territory advised the Auditor-General that it transferred its remaining systems in May 1978.<sup>3</sup>
9. Report of the Auditor-General 1977-78, Parl. Paper No. 221/1978
23. ADP Division, Public Service Board, "Report on Short Term Computing Bureau Services in the ACT", October 1976.

6.54 The Public Service Board has however informed the Committee that the agreement for the use of the MANDATA system provided for the removal of work by DCT and DIEA in the event of a machine overload occurring. The majority of the Capital Territory production work has now been transferred from the MANDATA computer. The balance of DCT production work and program development plus Immigration's production and development will remain on the MANDATA computer until December 1979.

6.55 The Committee suggested to the Ministers for Administrative Services and Science that consideration be given to transferring DCT and DIEA work to the new Facom M190 computer recently installed by CSIRO's Division of Computing Research. It is expected that this computer will not be fully utilized for some time to come. However, the decision has been taken to expand the Burroughs data centre at Fyshwick by the addition of another processor and to move the Department of the Capital Territory and the Department of Immigration and Ethnic Affairs back on to that bureau. The cost to the Commonwealth of using the Fyshwick data centre for DCT and DIEA work is approximately \$63 000 per month. This will rise to \$86 000 per month after September 1979.<sup>25</sup>

6.56 The Committee is concerned about the general situation where considerable amounts of money are being spent by Government departments with service bureaux and on new computing equipment while at the same time there is idle computing capacity available within the public sector. The Committee proposes to examine this matter in more detail at a later date. In the meantime we recommend that:

(38) *In line with its policy of providing a range of standard computing services available to arms of Government, tertiary educational institutions and industry, the CSIRO should give consideration to making excess capacity available on its M190 computer for administrative data processing by Government departments, to the extent that it will not adversely affect the research and development use of the computer.*

6.57 We also consider that insufficient use is being made by departments of expertise available within the Division of Computing Research of CSIRO. An example of this is the recent situation in which a large development grant was made by the Department of Productivity to a Melbourne firm to develop a large-scale computer without first seeking the advice of the Division of Computing Research.

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53. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 26 July 1979.
57. Chairman, Joint Committee of Public Accounts, letters to the Ministers for Administrative Services, and Science and the Environment, 27 February 1979.

PROJECT SLIPPAGE

6.58 The Auditor-General in his 1975-76 Report pointed out that the 1971 feasibility study envisaged the start of implementation of a basic operational MANDATA system in early 1975, and the completion of implementation of a full system by late 1979. As things turned out, a basic system was operational in three departments in June 1977 and implementation of a 'full system' is now planned for July 1981.

6.59 While this gives the impression that MANDATA is approximately two years late relative to the 1971 feasibility study estimates, it should be kept in mind that the 'basic system' in operation in 1977 fell considerably short of the basic system it was originally planned to deliver in 1975. Similarly the 'full' system now to be delivered in mid-1981 does not include all the features originally planned for delivery in 1979.

6.60 Comparison between the originally planned delivery dates and those currently planned for the more important sub-systems of MANDATA shows that they are running at least thirty-six months behind original schedules. For example, the leave recording system was originally planned to be implemented across the entire Service by the end of 1976.<sup>2</sup> This system is now planned for implementation in twelve or more departments by the end of 1979. As a further example, the transfer to Treasury (now Department of Finance) of all relevant details of allowances and gross pay was originally planned to be possible by mid-1978. It is now planned for mid-1981.

6.61 The Committee's view is that MANDATA is running at least three years late relative to the schedule in the 1971 feasibility study. For further comparisons see Table 10. The current schedule of availability of future sub-systems is given in Appendix 1.

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2. Public Service Board, MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer - based Personnel and Establishment System, November 1971. (Ss. 9.10 & 9.31)

TABLE 9

COMPARISON OF SCHEDULED AND ACTUAL TIMES  
FOR EQUIPMENT ACQUISITION STEPS

<u>EVENT</u>	<u>SCHEDULED</u>	<u>ACTUAL</u>
Submission of Feasibility Study to IDC	Feb 1972	Sep 1972
Consideration by Committee of Officials	Aug 1972	Jan 1974
Cabinet Submission	Sep 1972	Feb 1974
Tenders called for Equipment	Nov 1972	Aug 1974
Placement of Orders	May 1973	Jun 1975*
Delivery of Central Computer	Jul 1974	Feb 1976

TABLE 10

COMPARISON OF SCHEDULED AND ACTUAL TIMES  
OF AVAILABILITY OF SOME MAJOR PRODUCTS OR FEATURES  
(i.e. COMMENCEMENT OF IMPLEMENTATION)

<u>FEATURE</u>	<u>1971 STUDY</u>	<u>1977 STUDY</u>	<u>ACTUAL OR CURRENT ESTIMATE</u>
Basic System	Mar 1973	N/A	May 1977
Integration of Personnel and Establishment Systems through Internal Links	Mar 1973	Jul 1979	Dec 1980
Leave Processing	Dec 1976	not stated	Mar 1979
Notification of Salary to Superannuation	Dec 1974	not stated	Jul 1981
System on-line to Terminals in Departments	Dec 1974	not stated	Apr 1979
Transfer to Treasury of All Relevant Allowances and Gross Pay	Jun 1976	Jul 1981	Jul 1981

\* Letter of Intent.

2. Public Service Board, MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer - based Personnel and Establishment System, November 1971

6.62 In explanation of project delays the Board advised the Committee that the timetable in the 1971 report was predicated on the receipt of approvals for the development of the system by early 1972.<sup>2, 3</sup> This is somewhat at variance with the 1971 report itself which gives the planned date for the Cabinet submission as September 1972. In the event, Government approval was not given until February 1974, producing in effect a seventeen month deferment of the development timetable.

6.63 The Board went on to say that there had been further slippage of the program as a result of the "non-availability of additional staff resources which were required and which had been foreshadowed as necessary in the original feasibility study".<sup>3</sup> It was pointed out to us that delays caused by external factors restricting the availability of required resources (such as the Government's general policy of restraint in public sector spending) were beyond the Board's control.

6.64 In summary, of a total slippage of the 1971 timetable of at least thirty-six months, delay in obtaining Cabinet approval accounts for seventeen months. Other factors include shortage of manpower resources and the diversion of MANDATA resources to non-MANDATA tasks such as processing work for the Departments of the Capital Territory and Immigration and Ethnic Affairs.

6.65 The Auditor-General referred in his report to the cost resulting from deferment of cost savings and other benefits. The Board acknowledged this but stated that the project was still cost-effective in spite of the delays which had occurred. In view of the high cost of deferring benefits, the Committee is of the opinion that further unnecessary delays should not be permitted to occur. To this end the Committee has already made recommendations for the use by the Board of improved control methods (Recommendation No. 15) and for the avoidance of further diversion of MANDATA resources to non-MANDATA tasks (Recommendation No. 34). We further recommend that:

*\*(36) Department Heads should give full personal commitment to implementation of MANDATA, ensuring that required resources are allocated, monitoring implementation progress, and assisting staff to remove impediments to progress.*

2. Public Service Board, MANDATA - Report on the Feasibility and Economics of Establishing a Comprehensive Computer-based Personnel and Establishment System, November 1971.
3. Public Service Board, The MANDATA Project, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.
7. Report of the Auditor-General 1975-76. Parl. Paper No. 225/1976.

*\*(37) There should be no reduction in present staff ceilings applied to MANDATA development or implementation. The desirability of increasing ceilings should be examined immediately, taking into account the benefits that will accrue from early completion of the project.*

6.66 Direct comparison between original and later timetables and actual delivery dates for program subsystems has been rendered difficult by the changes in scope, changes in order of development, and name changes of the subsystems comprising MANDATA. (See for example Appendix 9).

6.67 Another factor which makes interpretation difficult is that it is not always clear from the schedules that have been presented to us whether the date referred to is that of product availability (i.e. available to users for the start of implementation) or the completion of implementation. Moreover 'implementation complete' can mean anything from complete for one or more departments through to complete for the whole Service.

6.68 In some cases product delivery dates have been set down in MANDATA documents with only the vaguest of specifications as to what will be delivered on those dates. For example, the Board has said that MANDATA will be "implemented in full by July 1981". The Board also refers to the "final phase of development in 1982".<sup>1</sup> Elsewhere the Director of the MANDATA Program has given "1979 or early 1980 for the delivery of the new (Phase 3\*) system which is being defined and yet to be agreed".<sup>2</sup> Such confusion over names, dates and the product specifications adds to the Committee's impression that there has been inadequate systematic and detailed planning of the project.

#### Development Plans for the Remainder of MANDATA

6.69 The Committee asked for detailed schedules for development and implementation of the remainder of MANDATA. In response the Board supplied those schedules contained in Appendix 6.

6.70 We do not consider that these plans have the clarity, structure or degree of detail to permit effective review and approval by users or by the Commissioners of the Public Service Board.

- \* Phase 3 is the name of the final stage of MANDATA according to the present development program.
12. Director, MANDATA Program Office, "Plan for MANDATA Phase Two", undated letter to departmental representatives of the MANDATA Co-ordinating Committee.
  1. Joint Committee of Public Accounts, Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1, Minutes of Evidence, 1978. (Pp 362 & 364).

6.71 The Board stated that no development cost plan for Phase 3 was yet available. An officer of the Board said:

(We have taken) a policy decision to develop the system and to concentrate on the achievement of that objective (the elimination of manual recording of SPR and establishment records) throughout the Service. That is the area that offers the most immediate and direct payoff. As a result of that, we have reduced the resources in the project that we could devote to the longer term planning and development of benefits which are further down the time-scale, in the interests of getting a quicker, more immediate and more direct payoff in the area where there is the highest potential for direct savings. As a result of that, we are not pressing on at this stage with highly detailed sophisticated plans for the final aspects of the system because we are putting as much effort as we can into the achievement of that principal objective.<sup>1</sup>

6.72 While the Committee is sympathetic to the need to make optimum use of limited resources, it considers that the cost estimates for completion of MANDATA have little meaning in the absence of a detailed definition of what is going to be produced and when.

6.73 The Committee was astonished when an officer of the Board suggested that the 1977 study carried out by external consultants provided a development plan for MANDATA.<sup>4</sup> The officer said:

The consultants in 1977 set targets which we are using as a guide to test our performance. That is a very thorough study. Making due allowance for the resources that we will have available to us...we are confident that we can achieve the targets that have been set by the consultants.<sup>1</sup>

6.74 The Committee does not share the faith which the Board apparently places in the cost estimates within the consultants' study. For example:

The current cost estimates have been developed by P.A. Consultants and the Board sees no reason to question them.<sup>11</sup>

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1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978.
  11. Public Service Board, Submission to the Joint Committee of Public Accounts, 6 September 1978.
  4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*, June/July 1977.

and:

We have a consultant's report which went into the definition of Phase 3 and the projected cost of it. We have no reason to doubt the estimates contained in his report.<sup>1</sup>

6.75 The consultants' report does not contain a definition of Phase 3 (though it does contain cost estimates for the remainder of development including Phase 3). We believe it is the responsibility of the MANDATA Program Office to establish its own development plans (even though it may use the advice of consultants as a basis for them). In our opinion the consultants' report is not, and does not purport to be, a development plan in the sense that we consider necessary for effective project management. It is a set of recommendations and conclusions about the project, made in response to specific terms of reference and although it does contain cost projections under major headings, these costs are apparently based on a broad statement of requirements for subsystems comprising Phase 3 which had been submitted to the consultants by the Board.<sup>1</sup>

6.76 We are not satisfied that the degree of detail of future plans for MANDATA, particularly as regards the external definition of subsystems, is sufficient either for review and approval by users and senior management of the Public Service Board, or for accurate project cost estimating. Accordingly the Committee recommends that:

- \*\* (39) *The MANDATA Program Office should prepare definitions for all major subsystems comprising Phases 2 and 3 of MANDATA, in sufficient detail to allow accurate cost estimating.<sup>4</sup>*
- \*\* (40) *The Program Office should use these product definitions to prepare cost estimates for the remainder of the project.*
- \*\* (41) *Such cost estimates should be employed for review, in conjunction with users, of the cost effectiveness of optional features and requirements, and for project cost control.*
- \*\* (42) *Such cost estimates should be reviewed and revised as proposed system requirements change.*

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\* See Appendix 9 for a definition of the three phases currently envisaged for MANDATA development. Phase 1 and parts of Phase 2 are complete. Phase 3 is scheduled for completion by mid-1981.

1. Joint Committee of Public Accounts, *Use of Automatic Data Processing in the Commonwealth Public Sector - Stage 1*, Minutes of Evidence, 1978. (Pp 413-414)

UTILIZATION OF REMOTE SITES AND EQUIPMENT

Minicomputer Sites

6.77 As we have indicated, the MANDATA system includes minicomputers in the Public Service Inspector's Office in State capital cities. The Auditor-General reported that delays had occurred in the preparation of some of the minicomputer sites.<sup>7-9</sup> The Board told us that delays in Adelaide, Perth and Sydney were due to the fact that it had been planned to use leased premises in these cities. This could not be done in accordance with the time schedule originally planned because in August 1975 the Government imposed general restrictions on the use of leased accommodation. As a result, approval to proceed with the leases was delayed until the 31st March 1976.<sup>9</sup> This delayed the presentation of the sites.

6.78 Construction problems in three States also caused delays. In cases where the minicomputers could not be installed, they were put into storage and maintained at a cost of forty per cent of normal maintenance charges. However, although site development was delayed, when the sites were finally completed, they still could not be used due mainly to unavailability of staff.<sup>8-9</sup> Thus at the end of June 1977 only the Canberra site was operating. Minicomputers which were installed but idle at other sites attracted maintenance charges of fifty per cent of normal maintenance rates.

6.79 The Melbourne site became operational at the end of 1977 and all other sites except Darwin in June 1978.<sup>9</sup> Note that 'operational' does not mean on-line to the central computer in Canberra. Except for the Canberra minicomputer sites, State offices were not on-line until April 1979.

Minicomputers

6.80 In June 1975 twenty-one minicomputers were ordered from NCR for MANDATA for installation in Public Service Board offices. These were progressively delivered, installed, and set to work according to the following table:

7-9. Reports of the Auditor-General, 1975-76 to 1977-78.

3. Public Service Board, *The MANDATA Project*, Supplementary submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.

TABLE 11

MANDATA MCU EQUIPMENT

DATES OF INSTALLATION, ACCEPTANCE AND COMMISSIONING<sup>47</sup>

Sys. No.	Del/Inst. Date to Site	Accept. Date	Date in Service	Location	Purpose
1	Jan 76	Jan 76	Jan 76	Blk 1 Barton	Program Development
3	Apr 76	Apr 76	Apr 76	" "	" "
3*	Apr 79	Prev. Accp.	Jun 79	Darwin	Data Entry
5	Jul 76	Jul 76	Jun 78	Brisbane	" "
6	Jul 76	Jul 76	Jun 78	"	" "
7	May 76	May 76	Feb 77	Cameron	" "
8	May 76	May 76	Feb 77	"	" "
9	May 76	May 76	Feb 77	"	" "
10	Apr 78	May 78	Jun 78	Sydney	" "
11	Aug 76	Aug 76	Feb 78	Melbourne	" "
12	Aug 76	Aug 76	Feb 78	"	" "
13	Aug 76	Aug 76	Feb 78	"	" "
17	Apr 77	May 77	Jun 78	Perth	" "
18	Apr 77	May 77	Jun 78	"	" "
19	Sep 76	Sep 76	Jun 78	Hobart	" "
20	Sep 76	Sep 76	Jun 78	"	" "
20*	Apr 79	Prev. Accp.	Jun 79	Brisbane	" "
21	Apr 78	May 78	Jun 78	Sydney	" "
22	Apr 78	May 78	Jun 78	"	" "
27	Apr 77	Jun 77	Jun 78	Adelaide	" "
30	Mar 77	Mar 77	Mar 77	Cameron	" "
31	Dec 77	Dec 77	Dec 77	DOT Melbourne	" "
42	Apr 77	Jun 77	Jun 78	Adelaide	" "

\* Relocated.

47. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 2 July 1979.

6.81 Delays in installing the computers were due to delays in site completion work. Changes to the development schedule for MANDATA prevented those that were installed from being set to work. Storage of minicomputers which could not be installed resulted in annual maintenance charges of approximately three per cent of the capital cost of the equipment so stored.<sup>13</sup> The Board argued that inflation was well in excess of three per cent per annum and that deferring delivery until the equipment was needed would have resulted in substantial price increases well beyond the storage costs.

6.82 The Committee notes that Contract No. ATB18280 with NCR for supply of the minicomputers did permit the supplier to increase the price of equipment delivered after 1.9.76 by the amount of any variations in manufacturing costs. What these costs might have been had delivery been deferred is unknown to the Committee, and no formula for estimating them is contained in the contract with NCR.

6.83 It is true that deferral of importation beyond the end of November 1976 would have cost the Commonwealth additional money due to exchange rate variation, but this was fortuitous and cannot be used to justify the premature delivery of the minicomputer equipment.

6.84 The Committee rejects the argument by the Board that the Commonwealth actually saved money because the maintenance charges were lower than the inflation rate. The Board, in putting forward this view, not only neglects the cost of interest on capital and of obsolescence, but also fails to account for the costs incurred by the Commonwealth after the minicomputers were installed but before they were set to work.

6.85 Minicomputers were not the only equipment idle for a long period. The Auditor-General reported that at June 1977, in addition to the minicomputers, there were data concentrator units, visual display units and printers also idle. The total capital cost of this equipment was \$1.44 million and recurring costs were being experienced of \$35 000 per annum. This equipment was idle, according to the Auditor-General, because "delivery schedules (had been) geared to the original implementation schedule for MANDATA".

6.86 An estimate of the cost of premature acquisition of this equipment can be arrived at fairly easily. The Auditor-General has reported recurring costs of \$35 000 per annum. In addition, interest on idle capital should be taken into account, especially since at the time this equipment was idle, the Government was paying interest at bank overdraft rates to the supplier of the central computer on the deferred payment for the equipment. This amounted to approximately \$66 000.

8. Report of the Auditor-General 1976-77. Parl. Paper No. 133/1977.

13. Public Service Board, *Inquiry - The MANDATA Project*, submission to the Joint Committee of Public Accounts, July 1977.

6.87 A significant additional cost is obsolescence. This is reflected in the reduced value of computing equipment with time, due to the availability of more advanced products for the same price, or equipment with the same capabilities at a lower price. As an example, computer memory costs per unit of information stored have been reducing by more than fifty per cent every two or three years and are expected to continue to do so for some time.<sup>14</sup> As a further example, one supplier recently announced a new range of computers priced below the same supplier's previous latest model but with three to four times its instruction execution rate.

6.88 The Committee does not recommend that purchase of equipment be deferred solely because lower cost equipment to do the same job will in due course become available. As we have stated previously, in making such a decision the cost of deferring benefits of the project must be taken into account.<sup>15</sup> However, the Committee considers that purchasing equipment before it can be put to use is an inappropriate means of offsetting the effect of inflation.

6.89 The order of magnitude of the cost to the Commonwealth of premature acquisition in the case of MANDATA may be estimated by looking at the interest, obsolescence and recurring costs on \$1.44 million for eighteen months. We estimate this to be approximately as follows:

Interest (10% per annum)	\$ 221 000
Obsolescence (20% per annum)	345 000
Recurring Costs	<u>52 500</u>
Total:	<u>\$618 500</u>

#### Data-Concentrator-Units

6.90 The original plan for MANDATA envisaged the use of specially programmed minicomputers as data-concentrator-units to permit the economical sharing of interstate telephone lines for data transmission. Each data-concentrator-unit (DCU) consisted of a pair of minicomputers, and associated memory and peripheral devices. Six data-concentrator-units plus a program development system were ordered from NCR under contract ATB18283 for approximately \$612 000.<sup>3</sup>

3. Public Service Board, *The MANDATA Project*, Supplementary Submission to the Joint Committee of Public Accounts, Papers Nos. 1-16.

39. Joint Committee of Public Accounts 174th Report, *Use of ADP in the Commonwealth Public Sector - Acquisition of Systems in the Public Service*, Canberra 1978.

42. Noyce, R.N., "Micro electronics" *Scientific American*, pp 63-69, September 1977.

6.91 Since 1977 when the decision was made not to use the data concentrator-units, attempts have been made to dispose of them within the Service. The Auditor-General has reported that two of the minicomputer units (i.e. the equivalent of one data concentrator-unit) have been disposed of to the Department of Employment and Industrial Relations.<sup>9</sup> Another is in use for program development by the Public Service Board. At June 1979 there still remained in store ten minicomputers and associated peripherals valued by the Board at \$396 000.<sup>47</sup>

6.92 The comments which we made in the previous section about obsolescence apply equally to the data-concentrator-units. We may therefore obtain an approximate estimate of the cost to June 1979 of the error of judgement which resulted in the purchase of these data-concentrator-units. We will make the following assumptions:

Interest on capital	-	10% per annum
Obsolescence rate	-	20% per annum (we regard this as a low estimate)
Delivery schedule as contract	ATB18283	
Disposal of two minicomputers to the Department of Employment and Industrial Relations at the end of 1977		

6.93 The costs to June 1977 are therefore approximately:

Interest	\$	253 000
Obsolescence		324 000
Recurring charges <sup>9</sup>		<u>32 000</u>
		\$509 000

6.94 The main event which led to the decision to scrap the DCU's was the introduction by Telecom of an alternative means of line-sharing. The Committee considers that this development should have been foreseen before the data-concentrator-units were purchased in 1975, since in January 1975 Telecom notified its major data-transmission customers that it was experimenting with the facilities in question (9600 bit per second transmission and multi-stream modems).<sup>35</sup> In August Telecom announced its

9. Report of the Auditor-General, 1975-76.

35. Australian Post Office, "Details of new services being considered", Datel Service Information Bulletin, 24 January 1975.

47. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 2 July 1979.

intention to provide this service.<sup>36</sup> Thus prior to the ordering of the data-concentrator-units in June 1975, the Board either knew or should have known of the probable availability of a lower cost alternative to the DCU's. The Board should therefore have changed the data transmission design plan and saved the half-million dollars which the DCU's have cost so far.

6.95 The Board has had little success in disposing of the min-computers which suggests that there is a considerable likelihood that they will be written off completely. The Committee regards this wastage as a reflection of lack of effective planning, co-ordination and experience within the project in the early stages of MANDATA design.

6.96 The Board has submitted a further reason for the dropping of the data-concentrator-units, namely that:

Agreement on a standard line protocol for data transmission between AFS departments could not be reached. This meant the use of DCU's for cross-linking with other networks could not be effected without additional development costs.

6.97 The Committee considers that the economics of linking into other networks (and the need to do so) through the DCU's should have been settled before the DCU's were purchased, not afterwards. We therefore recommend:

*\*(48) When designing data communications systems, departments should maintain close liaison with Telecom from early planning stages so as to be aware of forthcoming data communication facilities and to enable the most cost-effective design to be achieved before equipment is purchased.*

36. Telecom Australia, circular letter on Tariffs to Datel users, 1 October 1975.

CHAPTER 7

CONCLUSION

The Present Project

7.1 The ultimate value of MANDATA is still an open question. Potentially it is great but the extent to which it will be realized will depend upon the degree of improvement that occurs in the management of the remainder of system development, in the ability of users to apply effectively the information potential of the system, and in the ability of the Board to achieve real clerical staff savings.

7.2 It is not only a question of whether the system will meet its design goals. Even if it does so in every respect, it has not yet been demonstrated that all the goals are closely matched to the real information needs of managers, nor that they are all achievable, nor that departmental managers are skilled enough in manpower management to use the information effectively which MANDATA can provide.

7.3 Despite these uncertainties net benefits will undoubtedly be maximized by completing the project as quickly as possible and, following implementation, by redeploying or releasing staff without delay.

7.4 The Committee reiterates that the project for much of its life has been poorly planned and directed and that some aspects of its management remain unsatisfactory. This is of particular concern because, while the Board believes that it has a charter to co-ordinate and control ADP development within the Service, it has demonstrated less than adequate competence in planning and managing its own major ADP project.

7.5 The Committee believes that if any consideration is given in future to extending the powers or responsibilities of the Board for ADP co-ordination it should take into account the Board's handling of MANDATA. Until the Board conclusively demonstrates a greatly improved capacity to manage ADP development we believe it would be unwise to extend its power to control other Departments' projects. The Board should instead concentrate on completing the MANDATA project in an efficient and effective manner and on improving its ability to assist departments who need help in ADP development.

7.6 Whatever the outcome, MANDATA provides an extremely valuable case study of the difficulties of developing a large-scale system within the Public Service. While adoption of the recommendations in this report should help the Board to complete the project in a more effective manner, the most important outcome will be the application of recommendations and principles presented here to future major projects.

The Management of Future Projects

7.7 There is now a considerable body of published experience in the installation and use of computer systems. A large proportion of systems are reported to be unsatisfactory. According to Grindley and Humble surveys (of the private sector) indicated that:

A majority of users are disappointed with the results obtained from their computers; most installations failed to show the expected return in investment;

In some cases there was a worsening of performance in business areas where the computer is used.<sup>54</sup>

7.8 The following preconditions make a decisive contribution to successful computer installation:

- There exists a clearly articulated set of management objectives.
- Management has selected a function to be performed that will contribute significantly to these objectives.
- Alternative methods of performing the selected function have been considered, including the use of computers.
- The most cost-effective design of computer system has been selected for implementation.

7.9 Unsuccessful or disappointing installations are often characterized by one or more of the following:

- Functional objective of management unclear or not defined.
- Critical success factors for the computer not quantified, sometimes not defined.
- Economic justification of the computer takes into account only ADP costs and omits other costs associated with the installation, eg cost of relocating or retraining displaced staff, opportunity costs, cost of consequential changes in other departments.
- Poor project management. Many computer professionals have little or no management training or experience and fail to control projects using the best techniques of planning and cost control.

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54. Grindley, K., and Humble, J., *The Effective Computer*, McGraw-Hill, 1973.

These problems, often found in industry, may be exacerbated in government projects where ministerial and management bewilderment at computer technology, cause delegation of responsibility for the computer to lower levels of management and technical staff. Such people may lack adequate management ability or understanding of the impact of the project in other areas of the organization or may not have sufficient authority to overcome serious problems.

7.10 A decision to undertake the acquisition or development of a major system should be made only after careful consideration of:

- The appropriateness of the Government, Service or departmental objectives which are to be served by the computer system.
- The extent to which the system will support or impede the achievement of these objectives.
- Alternative non-computer methods of achieving the desired result.
- Alternative designs of computer systems to achieve the desired result.
- The adequacy of skills and number of persons available to carry out the work of development.
- The possible impact on other projects within the Service of obtaining the required personnel.
- All costs associated with the project including those of retraining displaced personnel, and severance costs.

7.11 If the goal for a proposed major computer system is the usual one of cost-effective performance of functions to satisfy user needs, a vitally important ingredient for success is that firm control be exercised by senior departmental managers, preferably department Heads, who know exactly what they want from the computer. Delegating control of the development to 'technical visionaries' has often resulted in the pursuit of technical objectives for their own sake.

7.12 The objective of future development projects needing most careful attention (and the one which has been most lacking in MANDATA) is fully effective management.

7.13 At the higher management levels there must be an understanding of the need for, and willingness to be involved in establishing overall system goals, ensuring that they contribute to organizational objectives and monitoring progress towards the goals.

7.14 At the lower levels there must be effective and sustained use of formal, proven project development methods and procedures. Comprehensive written standards must be developed and adhered to for system analysis, design, programming, documentation and reporting.

7.15 In addition, within and between all levels of project teams, there must be a regular pattern of communication of appropriate information - system objectives, development goals and actual achievements.

7.16 If management skills and experience are not adequate to perform these tasks, the development should not be undertaken or should be contracted out in whole or in part to system development specialists.

7.17 Unfortunately in making judgements on these matters managers and technical personnel too often fail to recognize deficiencies in their staffs' or their own skills. A department's competence to carry out development effectively should therefore be reviewed quickly by a disinterested but expert party and the responsible department Head should be advised accordingly. In theory the IDC on ADP could perform this function but in practice is likely to introduce unacceptable delays.

7.18 Effective mechanisms must be established for:

- the identification by or in conjunction with users, of the system's functional requirements.
- the clear documentation of, and formal agreement by users to, a functional specification.
- the frequent review by users during development of degree of conformity to specification.
- the periodic review by senior managers of the continuing validity of the original organisational objectives and the overall functional goals for the system.

7.19 The general approach outlined above, simple and reasonable although it may seem, was not the approach adopted for MANDATA. If it is applied to future projects the unfortunate history of MANDATA need not be repeated.

APPENDICES

*Use of ADP in the Commonwealth  
Public Sector - The Mandata Project*

IMPORTANT MANDATA DATES  
*Numbers in brackets refer to sources*  
*(See List of References)*

11 PSB produces Mandata feasibility study(2).

12

1

2

3

4

5

6

1972

7

8 PSB commissions CSA consultants to review proposal(32).  
 Preliminary consideration by IDC on ADP to Mandata proposal(32).  
 9 PSB gives notice to Dept of Interior of need for a site for Mandata(3).  
 Consultants' report presented; report is generally favourable.  
 10 IDC sets up sub-committee to review Mandata. Field study in Victorian  
 office of Dept of Supply confirms estimated savings from Mandata(32).

11

12

1

2 Report of sub-committee (working party) presented to IDC.

3 PSB decides to proceed with Mandata.

4

5 IDC formally considers working party's report and endorses Mandata  
 proposal(32).

1973

6

7

8

9 PSB provides draft site specification to Dept of Services and  
 Property(3).

10

11

12

1 PSB seeks support of Committee of Officials. Committee endorses proposal(32).

2 Approval in principle by Cabinet for Mandata.

3

4

5

6

1974

7

8 Tenders called for supply of computers(13).

9

10

11

12

1

2

3

4

5

6 Prime Minister endorses provision of funds for purchase of equipment(38). Letter of intent to Burroughs for supply of central computer unit and to NCR for minicomputers(13).

1975

7

8 Decision to use Trade Group Offices computer site B as the temporary site for Mandata(3).

9

10

11

12 Delivery of first Data Concentrator Unit(3).

1 Delivery of first minicomputer unit(3).

2 Central computer delivered(13).

3

4

5 Progress assessment by PSB. Decision to adopt Dept of Productivity system. Priority to be given to early availability of management information(13).

6 Contract signed with NCR for minicomputer units(13).

1976

7 Contract signed with Burroughs for central computer unit(13).

8 }

9 } Central computer accepted from Burroughs(13).

10 }

11 } Comprehensive review of development strategy.

12 }

1

2

3 New cost/benefit study carried out(4).

4

5 PA consultants engaged to report on Mandata to a special IDC(4).

6 Initial system (DATASTREAM) operational in Dept of Productivity, parts of Business and Consumer Affairs and the PSB. Runs on the Dept of Transport's computer in Melbourne(13).

1977

7 PA's report is issued and recommends continuation of the project (4).

8

9 Prototype LEAVE system introduced(11).

10 PSB's computer begins printing output from Transport's computer(11). Decision to restrict implementation to twelve client departments(11).

11 23000 staff records converted (target 70000), 47000 organization records(11). Dept of Trade computer area B selected as the permanent site for Mandata.

12 Melbourne minicomputer site operational(9).

1978

- 1
- 2
- 3
- 4
- 5 Data on orgs., pers. partic. & pos. occupancy for 6 client depts installed on Mandata. Installation for further 6 depts progressing(6).
- 6 All regional minicomputer calls operating except Darwin(6).
- 7 37000 staff records and 72000 organization records have been converted (11).
- 8
- 9 Target date for production version of LEAVE to commence field trials(11).
- 10 Target date for Dept of Education to instal LEAVE on a trial basis(11,38).
- 11
- 12 Initial Designation/Salary system available(38).
- 1 Target date for all processing converted to Board's computer(11).
- 2 Target for 55000 staff records and 72000 organization records converted (11).
- 3 Target date for completion of installation of organization and personal particulars and position occupancy for 12 departments(6).
- 4
- 5 LEAVE system accepted. LEAVE with on-line enquiry available in ACT(38).
- 6 'Advanced' version of Mandata Phase 2 to be available, comprising DATA-STREAM (ie Mandata Phase 1) and LEAVE/PERSONNEL system(27).
- 7 Target for on-line enquiry access during the day for all recorded info(11).
- 8 All processing moved to PSB's Mandata computer. Parallel processing to continue on DOT's computer until end of June. LEAVE system available for production in all states.
- 9 Mandata expected to be manned to staff ceiling level(26).
- 10
- 11
- 12
- 1979
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8 LEAVE to be implemented for initial 12 clients.
- 9
- 10 Completion of Phase 2 product allowing replacement of SPR card recording except for superannuation card. Old cards to be kept(38).
- 11 No major development work to be undertaken during this period(27).
- 12
- 1980
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

1980

- 1 75% of PS Act staff on basic Phase 2 system(34).
- 2 Mandata interrogation system (MIS) to be available for general use(28).
- 3 Target for SPR cards to be replaced in departments covering 50% of the Service.
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 1981
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

APPENDIX 2

PART I

"MANPOWER" - THE QUEENSLAND PUBLIC SERVICE BOARD

PART II

"PIES" - TELECOM AUSTRALIA

APPENDIX 2 - PART 1

THE QUEENSLAND PUBLIC SERVICE BOARD'S 'MANPOWER' SYSTEM

The following material has been extracted from the *Manpower User Manual*<sup>46</sup>.

INTRODUCTION

Early in 1975, the Public Service Board decided that a computer system was required to maintain a record of all public servants, positions and associated details to replace existing manual records and to provide a network of terminals to allow interrogations of the data. In August, 1975, the State Government Insurance Office (Queensland), in conjunction with the Public Service Board, commenced to design, develop, implement and process such a system. MANPOWER was the result and is now the computerised personnel and establishment system of the Queensland Public Service.

All preliminary work required before the information from the manual records could be transferred was completed by January 1976 and the conversion and transfer of all personnel and establishment details was commenced. By June, 1977, the majority of the information applicable as from January, 1976 was transferred and the first stage of MANPOWER became operational.

This first stage provided an information retrieval function on the data available while later stages provide additional facilities and an interpretive function on the data available.

This manual is designed to give users and potential users a general overview of the system and the many facilities and functions that are available.

SYSTEM OVERVIEW

Basically, MANPOWER is a comprehensive user-oriented system designed with particular emphasis on -

- ease of use
- flexibility
- security of data
- immediate access to all data
- multiple access to all data
- open-endedness
- reduction of clerical recording

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46. State Government Insurance Office (QLD), *Manpower - The Personnel and Establishment System of the Queensland State Public Service*, General Information Manual, developed for the Public Service Board, September 1977

To accomplish this, MANPOWER provides a comprehensive information recording, retrieval, data entry and enquiry facility in respect of current and historical data in relation to both people and positions. It also provides periodic and ad hoc reports to control and monitor a variety of personnel actions and enables many of these reports to be produced on request.

MANPOWER allows either centralised or decentralised insertion and correction of data and operates under privacy and security controls which restrict access to authorised users only. Access to data can be restricted to a departmental level and within that department, to authorised users only. It can be further restricted in respect of individual employee's records or specific data in respect of all employees.

Later sections of this manual detail the type of information available from the system and although provision is made for all information that is either required immediately or could be required in the future the flexible and open-ended design of the system enables either new or additional information to be included at any time.

As a result of the system, other benefits that have been realised include -

- availability of additional facilities/features not previously possible due to volumes and/or manpower e.g. Public Service List
- ease of collection of data for research purposes
- automatic availability of data for statistical purposes

DATA RECORDED

The heart of MANPOWER consists of a data base containing comprehensive information on each officer of the Public Service and on each position within departmental establishments. This data base actually consists of individual items grouped together into distinct but inter-related groups and recorded in such a way that it is a simple process to add additional items or groups at any stage.

The various groups and sub-groups of data for which provision is currently made in the data base are shown in Figure 1.

Historical data is also retained for most of these groups. This is achieved by simply allowing any number of entries for each group. For example, one entry contains the details of the current appointments of a person and the next entry contains the details of his previous appointment and so on. By this method a complete history of his appointments throughout his service career is maintained. A similar procedure is adopted for most of the groups of data comprising the data base.

All data held in the data base is interlinked in such a way that it is possible to gain access to any of the data from a variety of sources. For example, the establishment records contain the payroll numbers of every occupant of each position and each personnel record contains a reference to

every position occupied by that officer.

By using this interlinking procedure it is possible, for example, to obtain the personnel details of the current or any previous occupant of a known position.

All data held in the data base is subject to updating each week. Transactions to change, add or delete data can be generated either through visual display terminals or through normal data preparation facilities. Naturally both of these facilities are only available to authorised personnel. During the initial stages, all transactions to change any data in the system are generated by authorised staff at the Public Service Board but there are some areas where it would be advantageous and more economical for each department to be able to update at least selected items of information in relation to their own departmental staff.

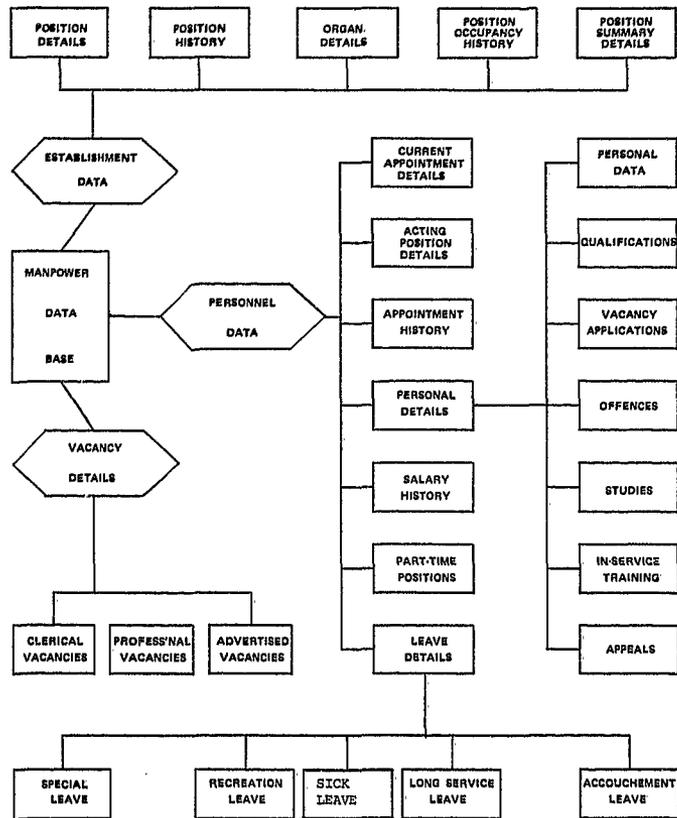


FIGURE 1 - MANPOWER DATA BASE

#### ON-LINE RETRIEVAL

All data in the system can be accessed by authorised personnel through visual display terminals. Information regarding any officer can be obtained simply by keying in either his payroll number or his name. From either of these requests any of the following details can be obtained on the display screens -

- . General information such as name, sex, date of birth, union membership current official title etc.
- . Name and details of change of name.
- . Initial appointment.
- . Current and previous appointed positions.
- . Current and previous relieving positions.
- . Increments withheld.
- . Previous service history.
- . Current allowances.
- . History of allowances received.
- . Miscellaneous personal details such as superannuation details and decorations.
- . Offences.
- . Details of contracts.
- . Details of separations from the service.
- . Address.
- . Qualifications.
- . Service history.
- . Leave history and leave due.

All positions in the Public Service have been assigned a position reference number and any personnel information displayed on the screens containing details of positions eg appointed or relieving positions, will show the related position reference number. This reference number can be keyed in to obtain any of the following details regarding any position within departmental establishments -

- . General information such as official title, type of position, classification, how created, current occupant and appointee etc.
- . Allowances related to the position.

- . History of the position.
- . History of occupants and appointees to the position.

As well as historical information being available as shown above, any item of information can also be obtained for any specified date. For example, if you wish to know what position a certain officer was occupying on 9th June, 1975 it can be found by keying in either his name or payroll number and the date required. The required information will then be shown on the screen.

#### PRINTED OUTPUT

During each weekly update of the data base a number of control reports are printed. These listings are used mainly by the Public Service Board to control and monitor the operation of the system.

In addition to these, a number of other pre-determined reports can be either produced automatically or on request from authorised users. These requests can be input through the visual display terminals used for general enquiries. The types of reports included in this area are as follows -

- . Officers under contract as at a given date.
- . Officers requiring proof of age and/or union membership.
- . Officers due to retire within six months from a given date.
- . Probationary reports required.
- . Officers resigned etc. between two given dates.
- . List of temporary employees as at a given date.
- . List of officers appointed between two given dates.
- . List of officers receiving specified allowances.
- . Salary and classification increases for a given month.
- . Cost of x% or \$x increase under any award.
- . List of officers in the Public Service.
- . Award Listing.
- . Establishment dissection listing.
- . Establishment breakdown summary.
- . Officers with offences since a given date.
- . Positions vacant at any given date.

Many of the above listings and reports are produced on a departmental basis and as such will be available to each department.

## SECURITY

As the Public Service Board is only one of many possible users of MANPOWER and MANPOWER is only one of many users of the SGIO computer facilities, security of the information held within the system is of utmost importance. Strict security at various levels has been built into both MANPOWER and the computer facilities. This security consists of passwords and other internal controls to restrict access to authorised personnel only.

All data used by MANPOWER is recorded under password controls and normal access to any of the data is only possible through MANPOWER itself by using authorised visual display terminals. All authorised terminals are known to MANPOWER and any attempt to gain access through any other terminals will be rejected. A password/user code combination is assigned to each terminal when it is installed and these must be entered correctly by the user to activate the terminal. If these are not known it is not possible to even start the terminal. Once activated, it is then possible to enter the MANPOWER on-line system but all of the facilities available are under password control. A valid password must be entered by the user before the system will recognise any request. These passwords are assigned to authorised users by the Password Controller at the Public Service Board when access is granted to any of the facilities of the system. This password is used to restrict the access of the user to only those facilities allowed. It can also be used to restrict the user to only certain types of data such as his own department only or selected items of data within his department. It will also specify the type of access granted e.g. retrieval of information only or allowed to change selected items of information.

In other words the MANPOWER system is controlled by the Public Service Board where control of the following is defined -

- . which terminals can use the system
- . what users can use the terminals
- . who can have access to the MANPOWER data
- . what items of data are to be made available
- . what facilities of the system are available to each user.
- . who can input new or changed data

## AD HOC REQUESTS

Because of the nature of the system it is expected that various ad hoc requests for special information or statistics will be made of the system. To cater for this, provision is made for a general purpose statistical and selection system to be operated through the visual display terminals.

To use this facility, the statistical system will provide an enquiry page on the screen. By entering the required parameters onto the screen, the system

will automatically generate the processing required to satisfy your request. In this example a listing is requested to show the Department, Name and Classification of all systems analysts/programmers within the Public Service on a classification of 1.8 or higher.

Most of these types of requests will not be able to be answered immediately, as is the case with a normal enquiry request, as it will normally require accessing the complete data base and not just one or two specific records. As a result the details requested will normally be printed out at a suitable location for later collection by the requestor. In some cases it will be possible to examine the results of the request through the visual display terminals either before or in place of it being printed.

## DEPARTMENTAL FACILITIES

Access to the systems by any State Government Department is possible through visual display terminals. All of the on-line retrieval functions described earlier in this manual can thus be obtained by any department. Although the amount of data would be restricted, it would allow authorised staff within the department to retrieve and examine all personnel and establishment data applicable to the department concerned.

One of the main areas that can be utilised by each department is the recording and determination of all leave requirements. All leave taken by all officers of the department can be recorded in the system by entering the details through the terminal. MANPOWER can then determine, and display, how much leave has been taken and how much is accrued at any point in time.

A further area that could be effectively used by each department is the data entry facility. Although use of this facility is restricted, some items of data could be entered into the system from each department and reduce the amount of paper being sent between departments. Some of the items in this area include dates of commencing duty and union membership. Other items which are currently recorded by each department but are not necessarily advised to the Public Service Board could also fall into this category. These include employees address and internal transfers.

Although most printed output is supplied to the Public Service Board, some of the listings and reports are also available on a departmental basis. These will therefore be available to each department and can be requested through the visual display terminals.

The general purpose statistical system to satisfy ad hoc requests is also available on a departmental basis. Naturally any requests will be restricted to individual departmental data only.

MANPOWER, at this stage, is still in its infancy. As it grows, so will the features and facilities that will be made available to all departments.

APPENDIX 2 - PART II

TELECOM'S PERSONNEL INFORMATION AND ESTABLISHMENT SYSTEM (PIES)

The following details are from a statement<sup>48</sup> by Telecom in answer to written questions by the Public Accounts Committee.

Background

Staff records of the Australian Post Office had been partially automated in 1972 in the PAYVAR system, which inter alia, facilitates implementation of arbitration determinations. The automated PAYVAR system was a further development of a punch card system successfully introduced in 1963. As part of the establishment of Telecom and Australia Post a supplementary system had been established, drawing on the information contained in PAYVAR, to assist in the allocation of staff between the two statutory bodies and to form a basic automated record of personnel. Experience with this approach suggested that it could be further developed to meet all the needs of Telecom at an attractive cost.

Throughout the period leading up to the decision, contact was maintained with the Public Service Board by memoranda from the Permanent Head and at officer level. As reservations strengthened appropriate and timely steps were taken to minimise any difficulties to the Public Service Board consequent upon the decision of Telecom Australia not to participate in the MANDATA system.

As outlined above, partial personnel records have been maintained on computer by Telecom since 1972. These records are held on the master file of the PAYVAR system. This system is used to automatically prepare salary variation advices and superannuation election advices for staff affected by arbitration decisions. The system assisted Telecom to adjust the salaries of all staff affected by a National Wage Decision or an Award generally within three pay periods as negotiated with the staff associations. The personnel information held was and still is also used to meet statutory requirements such as superannuation and furlough liability reporting and staff lists.

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48. Secretary, Australia Post, letter and attached statement to the Secretary, Joint Committee of Public Accounts, 8 September 1978.

When the Public Service Board originally approached the Post Office about MANDATA, it was pointed out to the Board that some automated personnel records had to be maintained for the purposes of the PAYVAR system and additional information would need to be held for the purposes of the then proposed automated Staff Pay system which was the next stage in the development of PAYVAR. The correspondence between the Post Office and the Public Service Board reflected agreement to the Post Office's need to continue to separately automate those personnel records essential for Staff Pay.

The computer based Staff Pay system has been completed and is now in operation in Headquarters and South Australia. Introduction in the Victorian State Administration is about to commence. The files for this system contain that personnel information necessary for the preparation of staff pay which comprises the major part of the information maintained on personnel official history cards. This validated record of personnel history will be used, as were the PAYVAR files, as the basis for the automation of systems to prove improved management capabilities and to meet statutory requirements in the personnel field.

A consolidated system to meet the Personnel management requirements of Telecom was initially planned in three stages.

Stage 1 - Maintain the automated staff lists which were prepared as an aid to the allocation of APO staff between the two Commissions, and accumulate some historical information.

Stage 2 - Extend Stage 1 to include additional historical information and update the information more frequently.

Stage 3 - Revise the system to draw its input from the automated Staff Pay system and add other information appropriate to servicing needs of both the staff and management of the Commission such as qualifications and long term leave records.

This staged approach was formulated and adopted so that the costs and benefits of each stage could be identified and controlled. This follows the general approach within Telecom where emphasis is placed on continuing oversight of projects and a concern for cost effectiveness of the use of automated data processing.

PIES

The first stage of the Personnel Information and Establishment System (PIES 1) was used from 1975 to 1978 but with the introduction of the automated Staff Pay system became obsolete. Review of the project during system specification for Stage 2 led to amalgamation of Stages 2 and 3 into a single Stage 2. The development of the redefined PIES 2 was endorsed in August 1977.

There is in addition a pilot development under way in the NSW State Administration to automate establishment records. This system is being developed on cost/benefit grounds based on the clerical effort involved in maintaining establishment records and producing establishment variation certificates. In the longer term, the benefits of incorporating this system within the main automated personnel records system will be examined. In the interim, if experience with the pilot system in NSW is satisfactory, it will be extended for use in all States and Headquarters.

The PIES 1 system provided basic monthly staffing, recruitment, and wastage statistics. When the automated Staff Pay system was introduced, the costs of modifying PIES 1 to take input from that system also were judged not warranted and use of the system was discontinued.

Telecom's need continues for accurate and up-to-date personnel information, for internal management requirements such as manpower planning and to satisfy statutory requirements of such bodies as the Australian Bureau of Statistics and the Government Actuary. The second stage of the Personnel Information and Establishment System (PIES 2) will meet this need for all Telecom staff. The system will draw input covering basic personnel details and movements (including higher duties) primarily from the Staff Pay system, ensuring that the information is accurate and up-to-date, and avoiding separate data transcription costs. Inputs of educational qualifications and details of long term leave not recorded on the Staff Pay system will be provided manually. The system will be updated monthly. Amongst the reports which will be available periodically or on request are:-

- . Staff numbers )
- . recruitment )
- . wastage ) High priority
- . Long term leave )
- . age x length of service distribution )
- . movement data )
- . long service leave taken )

- . transfer/promotion )
- . age distribution: length of service )
- distribution )
- . staff wasted by age or length of service )
- . cohort analysis ) lower priority
- . educational qualifications )
- . service date list )

The obsolescence of PIES 1 caused by the progressive replacement of PAYVAR by the Automated Staff Pay system has required the continued use of manual systems for some manpower planning statistics pending the implementation of PIES 2. Statutory and other basic requirements are still met using manual systems and also the data from PAYVAR and Staff Pay.

The pilot automated establishments records system being developed in the NSW State administration is designed to update Establishment Records, to produce Establishment Variation Certificates from approved Proposals for Establishment Variation, and to supply regular and ad hoc reports of a statistical nature.

The following will be the major outputs of the system:-

- . Establishment report
- . Variation to establishment
- . Section 46 embargo positions to be reviewed

The reports can generally be produced to section level and by designations.

Costs

The development of the automated personnel record system PIES 2 was expected to cost \$1.1m at 1976/77 prices when approved for development in August 1977. The original cost estimates comprised the following:

Systems specification	\$	179 000
Detailed specification	)	492 000
Programming	)	
Testing		176 000
Implementation		68 000
Development computer capacity		212 500
Hardware		NIL
Annual operation cost		140 000 by 1980/81

These prices include Telecom subject matter staff involved in systems development.

It is expected that the current delay will contribute some increase to the system development costs estimated.

The system being developed in NSW is estimated to cost \$81 000 at 1977/78 prices broken up as follows:-

	\$
Systems specification	) 21 000
Detailed specification	) 35 100
Programming	)
Testing	11 000
Implementation	4 400
Development computer capacity	6 500
Hardware	3 000 (1 terminal)
Annual operating cost	12 000

It is estimated that it will cost approximately \$42 000 to extend this system to other State Administrations and Headquarters. The Australia wide operating costs are estimated at \$27 000 by 1980/81.

The investment to be made in automation of personnel activities may seem low having regard to the complex staff structure of Telecom and the size of the staff. The costs for both the systems reflect the specialisation and economies of scale in the data processing operations of Telecom Australia, the generally tight approach to management of data processing projects and the emphasis on cost effectiveness.

PSB ADVICE TO PERMANENT HEADS

On 17 April 1972 the Chairman of the Public Service Board, Mr A.S. Cooley, forwarded a letter (see pages 116-121) to the following Permanent Heads, describing the proposed MANDATA System.

Sir Donald Anderson, CBE	Director-General, Civil Aviation
R.E. Armstrong, Esq., CBE	Secretary, Immigration
R.M. Bannerman, Esq.	Commissioner, Trade Practices
L.F. Bott, Esq., DSC	Secretary, National Development
Sir John Bunting, CBE	Secretary, Prime Minister and Cabinet
E.T. Cain, Esq., CBE	Commissioner of Taxation
A.T. Carmody, Esq., CBE	Comptroller-General, Customs and Excise
Sir Hugh Ennor, CBE	Secretary, Education and Science
J.Q. Ewens, Esq., CMG, CBE	First Parliamentary Counsel
F.J. Green, Esq.	Secretary, Air
L.B. Hamilton, Esq., OBE	Director-General, Social Services
C.W. Harders, Esq., OBE	Secretary, Attorney-General's
D.O. Hay, Esq., CBE, DSO	Secretary, External Territories
Sir Lenox Hewitt, OBE	Secretary, Environment, Aborigines and the Arts
W. Ives, Esq.	Secretary, Primary Industry
R. Kingsland, Esq., CBE, DFC	Chairman, Repatriation Commission
S. Landau, Esq., CBE	Secretary, Navy
E.F. Lane, Esq.	Director-General, Post and Telegraphs
T.F.C. Lawrence, Esq.	Acting Secretary, Supply
R.S. Livingston, Esq.	Acting Secretary, Trade and Industry
J.F. Nimmo, Esq., CBE	Secretary, Housing
Major-General Sir William Rafshauge, CBE	Director-General, Health
A.S. Reilher, Esq.	Director-General, Works
V.J.W. Skermer, Esq., CBE	Commonwealth Auditor-General, Auditor-General's Office
G. Warwick Smith, Esq., CBE	Secretary, Interior
M.M. Summers, Esq.	Secretary, Shipping and Transport
Sir Arthur Tange, CBE	Secretary, Defence
Sir Keith Waller, CBE	Secretary, Foreign Affairs
Sir Frederick Wheeler, CBE	Secretary, Treasury
B. White, Esq., CBE	Secretary, Army

COMMONWEALTH PUBLIC SERVICE BOARD  
CANBERRA A.C.T.  
Telephone 730411

OFFICE OF THE CHAIRMAN  
17 April 1972

COMPUTER-BASED PERSONNEL AND ESTABLISHMENT  
RECORDS - MANDATA SYSTEM

On the 23 December 1970 my predecessor wrote to all Permanent Heads advising them of a study of the feasibility of a Service-wide computer based personnel and establishment record system which was being undertaken by a working party within the Board's Office.

2. The study was initiated against the background of significant co-ordinated system development work in the personnel area being undertaken in the Civil Services of the United Kingdom, Canada and the United States. A further background consideration was evidence of the need, expressed by several Commonwealth departments, for more effective personnel systems based on computer processing, and the recognition of the difficulties that might be encountered if a number of such systems were developed independently without consideration of the desirable extent of co-ordination across the Service.

3. The working party has now submitted two reports. The first of these contained the conclusion that a single comprehensive computer based system was to be preferred over individual systems even where such separate development was closely co-ordinated; a broad outline of a single system, assessed to be both practicable and cost effective, was also included in the report. The second report, of which a copy is enclosed, represents the result of a considerable amount of further study and discussion with departments directed at achievement of a more precise and detailed definition and evaluation of the single system, and at a closer examination of the economics of introduction of the system. The additional study served to confirm the earlier conclusion that the system would be operationally practicable and economically viable; the working party recommended adoption of the system.

4. The main features of the MANDATA system proposed in the report are as follows:

- (a) There would be an extensive data base (with appropriate program links between personnel and establishment areas of the data base) containing comprehensive information:

. on each member of a population of permanent and temporary staff and, where practicable, exempt staff and

. on departmental establishments.

- (b) The data base would be held on magnetic media and processed by a central computer installation, located in Canberra, operated by the Board's Office.
- (c) Small computers in each State connected to the central installation by telecommunications lines would be used for local input and output. These small computers would be situated in each Public Service Inspector's Office and the State Administrations of the Post Office.
- (d) Some 550 display terminals located in departments and the Board's Office would permit virtually immediate access to the centrally held data base for record enquiries, with a response performance of 5-10 seconds. Interrogations for more complex information would be satisfied less quickly, but the response time would be much superior to that obtainable from manual systems.
- (e) Provision would exist for automatic data interchange with the Treasury payroll and Superannuation Board systems. (Refer paragraphs 5-8, below).
- (f) Comprehensive privacy procedures would ensure that only authorised officers could initiate enquiry or updating transactions, and that access by these officers was restricted to parts of the data base for which they had a legitimate 'need to know' or 'right to update'.
- (g) Continuity of operation of the system would be ensured by a number of measures including duplication of appropriate elements of equipment and utilization of comprehensive 'recovery' procedures which would reduce to a minimum interruptions to service arising from equipment faults, etc.
- (h) Automatically applied accountability controls would ensure that data entering, held in, or leaving the system were properly accounted for; such controls would include the ability to trace the location of prime documents authorising changes to the data base.

(i) With the implementation of the proposed system the existing manual standard personnel record system would be phased out; it may also be possible for other paper records to be discontinued.

(j) The system would be designed within the framework of existing personnel policies and rules but with sufficient flexibility to accommodate changes which might be introduced in the future.

5. In addition to providing a comprehensive personnel and establishment record, it is intended that MANDATA would provide through data link, information concerning pay entitlements ("elements of gross pay") to the Treasury payroll system and to the Superannuation Board system for the maintenance of contributors records. Thus, three significant systems would be linked, with concomitant advantages to each and a very substantial reduction in the creation of paper input by departments, input which must now necessarily be prepared to service the systems individually.

6. The present Treasury payroll system is a highly developed and smoothly running computer system which prepares the payroll for most Commonwealth departments (specifically it excludes the Post Office and, for the present, Civil Aviation and elements of Supply). It takes as a starting point the advice of salary entitlements at annual rates and accepts variations expressed in annual rates and periods of time. In its present form the system calculates gross pay due in a particular fortnight and includes in that calculation penalty rates, allowances, e.g., district allowance, and over-time. Certain types of mass adjustments, which avoid the preparation of individual input data, such as the National Wage Case adjustments, are handled by the Treasury system.

7. None of the comments and suggestions which are included in the MANDATA Report reflects an intention to remove the calculation of salary entitlements from the Treasury system to MANDATA - the latter would provide by data link elements of gross pay which the former currently receives direct from departments in the form of paper input. Any change to current procedures would be made only after full discussion and agreement with the Treasury.

8. It is understood that the Treasury, for its own part, intends to re-develop the payroll system in conjunction with a proposal to install centralised computing facilities and there would be an obvious need for close liaison between the two groups to ensure harmonious and efficient development of the two systems. Similarly, close liaison would be established with the Office of the Superannuation and D.F.R.B. Boards.

9. It is apparent that the MANDATA system as described in the foregoing paragraphs, poses a number of potential problems which will require detailed examination. In this regard the Board's Office, in consultation with departments as required, will be pursuing studies in areas such as:

- content of the data base, with particular reference to the holding of 'sensitive' information;
- right of access to the data base;
- organisational impact on the Service;
- industrial relations aspects.

10. The report envisages the phased implementation of the major elements of the system between January 1975 and December 1979, although certain aspects of a preliminary nature could be introduced as early as mid-1972. It is estimated that aggregate staff savings in personnel record-keeping areas during the initial 10 year operational period (i.e. 1975 to 1984) could reach, 5,500 man-years, and there would also be a significant reduction in the level of overtime worked in departmental staff sections. About 1,100 man-years effort in total would be expended in system development, in the departmental implementation, and from 1975 to 1984 in operation and maintenance of the system.

11. Estimates covering the initial development period followed by a 10-year operational period indicate that the system could yield a favourable discounted cash flow of \$15.7 million, representing a benefit to cost ratio of 1.61.

12. In addition to quantifiable savings, significant other benefits would also be expected. These would include the following:

- (a) There would exist an integrated data base containing comprehensive service data for all staff employed under the Public Service Act, the Naval Defence Act and the Supply and Development Act, and corresponding establishments data. Data entering the system would be subject to automatic validation tests and processed with speed and consistency.
- (b) The data base would be maintained in an up-to-date condition through the prompt reporting of all relevant events, actions and decisions. The use of the data base to initiate the payment of allowances, etc. would constitute an incentive for such promptness in reporting.

- (c) Information provision would be comprehensive and timely both to meet the needs of day to day personnel work and to aid personnel management at all levels.
- (d) Special facilities, which would give the system a capability superior to manual systems, would include:
- (i) a 'mass change' facility by means of which changes affecting a group of staff (e.g. an arbitration determination), or group of positions, could be implemented quickly with negligible human effort;
  - (ii) a facility to 'monitor' complex administrative procedures (e.g. appointments action) to ensure their correct completion within acceptable time scales;
  - (iii) an 'interrogation' facility which would permit the ready selection and association of virtually any combination of elements in the data base, with output in the form of listings, tabulations or graphical representations, as appropriate;
  - (iv) facilities for applying various mathematical techniques to the data base.
- (e) The unified nature of the proposed system would permit a more standard approach to be taken to the application of personnel rules; provision would be made for departments to incorporate their own distinctive requirements within the system.
- (f) The proposed system could provide a better service to staff as a result of greater accuracy and promptness of advice to Treasury of entitlements.
- (g) Certain functions of considerable difficulty in manual systems, e.g. personnel planning, etc. would be readily handled by the proposed system.
- (h) Establishment control would be facilitated by the availability up up-to-date information on current establishment and staffing, staff turnover, incidence of certain types of leave and other indicators, etc.

13. In sub-paragraph 4(a) above, reference was made to the inclusion of exempt staff in the data base. While the desired objective is to include all exempt staff in the proposed system, it is recognised that a complete coverage might not be practical because of the employment characteristics of certain short-term exempt staff (e.g. casual employees in remote localities, seasonal employees, etc.). The Board is currently seeking to identify any groups which might best be excluded from the system, and will confer with departments in due course.

14. It will be noted that the report refers to the need for further discussions with departments, following any decision to proceed with introduction of the system, in relation to:

- (a) detailed demarcation of spheres of responsibility and definition of information flows, vis-a-vis Treasury and Superannuation Board systems;
- (b) securing departmental participation in the development of the system by obtaining staff from ADP and subject-matter areas on a full-time basis;
- (c) the formation of a standing committee (MANDATA Co-ordinating Committee) to allow departments to participate fully in the development and subsequent operation of the system.

15. It is envisaged that the MANDATA Co-ordinating Committee would function as a top-level advisory body to the Board's Office on all aspects of design, development and operation of the system, and would provide a forum for discussion and solution of problems associated with the system. In order to achieve the widest possible representation of departments, without permitting the Committee to become unduly large, it is considered that permanent representation on the Committee should be restricted to the Board's Office and a comparatively small group of departments but with representation from other departments as required. In addition, all departments would receive documentation relating to the work of the Committee.

16. As a result of its consideration of the submissions made to it, the Board has decided to endorse the proposed system in principle subject to consideration of the views of Permanent Heads. The Board proposes to keep staff associations informed on developments.

17. I shall appreciate your comments, by 12 May 1972, on the proposed system.

Yours sincerely,

A.S. COOLEY  
Chairman.

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SOME SITE PLANNING EVENTS

<u>Date</u>	<u>Correspondence and Meetings</u>
May 1972	Public Service Board requests space from Customs and Excise in Stage 1 of Trade Building.
Oct 1972	Trade and Industry to PSB stating that NCDC advises against Trade Stage 1; prefers Trade Stage 2.
Nov 1972	Interior to PSB - confirms that Trade Stage 1 not suitable ... will look at the possibility of using Stage 2 and at the availability of other suitable areas.
Jun 1973	PSB to Services and Property - suggests that a meeting be arranged to discuss the possibility of using Trade Stage 2.
July 1973	Meeting PSB, NCDC, Services and Property - agree to study feasibility of using Trade Stage 2.
Mar 1974	PSB to Services and Property advising of urgent need for a confirmed computer site.
June 1974	Meeting PSB, NCDC, Services and Property and architects - agree that Stage 2 location available and capable of being fitted out.
Sept 1974	PSB to NCDC - Trade Stage 2 site marginally acceptable. Requirement for additional air-conditioning, auxiliary power, etc.
Nov 1974	NCDC to Services and Property - advises that Commission no longer considers it possible to locate computer in Trade building.
Dec 1974	Meeting PSB, NCDC, Services and Property, Housing and Construction and Overseas Trade - discussion on possible use of Trade computer area B and lower ground floor of Anzac Park West. Former site opposed by Trade representative. Feasibility study to be undertaken to establish suitability of Anzac Park West.
Dec 1974	Meeting - Public Service Board, NCDC, Services and Property - Anzac Park West regarded as an acceptable site; NCDC reluctant to develop Anzac Park West because of unused Trade computer area B.
Jan 1975	Services and Property to NCDC confirming Anzac Park West as the site for MANDATA computer.

Apl 1975 NCDC to PSB - Commission concerned at cost of developing Anzac Park West. No guarantee that site will be available when required.

Apl 1975 Meeting - PSB, NCDC, Services and Property - agreed that Anzac Park West site suitable.

May 1975 Meeting - PSB, NCDC, Housing and Construction - noted acceptance of Anzac Park West as suitable site.

Aug 1975 Meeting - PSB, NCDC, Services and Property - NCDC advises that works program cut and hence no work can start on Anzac Park West until April 1976.

Aug 1975 Meeting - PSB, Burroughs, architect - discussion on possible use of Trade B computer area at this stage earmarked for Department of Trade computer.

Aug 1975 Meeting - PSB, NCDC, Services and Property - confirmed funds problem. Anzac Park West site would not be ready until December 1976 or April 1977. Preliminary discussion on reverting to Trade building.

Aug 1975 Services and Property to PSB indicating that NCDC had been asked to prepare the Trade B computer site for Mandata.

Nov 1975 NCDC to PSB advising that development of Anzac Park West site had been effectively abandoned.

Feb 1976 Central computer delivered and installed at Trade Computer area B on a temporary basis. Acceptance is delayed due to faults in the airconditioning. NCDC accepts some responsibility because of an error in work carried out in late 1975.

June 1976 Acceptance of the site by PSB subject to provisos about fine tuning of airconditioning.

Sept 1976 Acceptance of the computer from the manufacturer.

Feb 1977 Considerable trouble experienced with air-conditioning. Computer suspended on several occasions for periods of up to four hours.

3rd & 4th quarters 1977 Feasibility study carried out on suitability of Benjamin offices at Belconnen. Cost of using the Benjamin offices would be one million dollars more than making the Trade Computer B area suitable.

1978

Decision taken to stay permanently in the Trade group computer area B and to use the space previously allocated to other departments. Cost of required airconditioning and structural changes estimated at \$700,000<sup>9</sup> of which approximately \$325,000<sup>11</sup> is chargeable to Mandata.

- 
9. Report of the Auditor-General 1977-78. Parl.Paper No.221/1978.
11. Public Service Board, Submission to the Joint Committee of Public Accounts, 6 September 1978.

APPENDIX 6

EXAMPLE OF PLANS FOR MANDATA

*The following document was supplied by the Board in response to a request to provide the up-to-date schedule of development milestones showing currently estimated implementation dates together with definitions of what is to be accomplished by those dates.*

Public Service Board  
26 May 1978

DEPARTMENTAL REPRESENTATIVES OF  
THE MANDATA CO-ORDINATING COMMITTEE

Plans for MANDATA Phase 2

At the recent meeting of the MANDATA Co-ordinating Committee, I undertook to produce a plan to implement a second phase of Mandata by February 1979. At the meeting departmental representatives conveyed most strongly to me that their minimum requirement for Phase 2 is a system which will provide nothing less than the facilities now offered by the existing (Phase 1) MANDATA system. Also I am now clear in my mind that the current twelve client departments should be given preference in the implementation of an improved version of the MANDATA system.

2. The Board has clearly indicated to me that tangible results from MANDATA must be produced quickly. Increased efficiency in record keeping areas, an increased range of management information and staff savings are among the benefits sought.

3. A way to meet these requirements has been found. The proposed solution is not elegant but worthwhile.

4. The existing MANDATA system would be converted to run the updating of Departmental master files on MANDATA's Burroughs 7700 computer. Personnel and position records for all departments could be brought up to date each second night (instead of fortnightly as at present). A multi-record interrogation facility as an overnight service would also be provided. In parallel with that work on the LEAVE system would be completed.

5. The combined effect of the two systems i.e. existing MANDATA (converted) and LEAVE would be to substantially penetrate record keeping areas in departments. These paper records would be duplicated to a large extent by computer records:

- (i) SPR form 53, official history record
- (ii) SPR form 54, temporary transfer and higher duty record
- (iii) SPR form 55, leave (all absences from duty) record
- (iv) Organisation position record
- (v) Position occupancy (substantive and actual) record.

On this basis there would be workload savings in departmental personnel and establishment sections. Also, there would be more efficient record keeping and an increase in management information available to departments quicker than under present arrangements.

6. The existing MANDATA (converted) system would be operational in the current 12 client departments in December 1978. The LEAVE system, with its on-line enquiry facility, would become available to departments in all States from February 1979.

7. During the first quarter of 1979 further work would be completed e.g. to extend the enquiry facility to enable on-line access during the day to all recorded information. This would enable the records (i) and (ii) listed in para 5 to be displaced. Record (iii) would be displaced by the LEAVE system and records (iv) and (v) should be progressively displaced by the existing Phase 1 system (DATASTREAM).

8. On-going MANDATA development would continue separately. The end of 1979 or early 1980 is envisaged for delivery of the new (Phase 3) system which is being defined and yet to be agreed.

9. I will seek MANDATA Co-ordinating Committee endorsement of this plan for Phase 2 at the June meeting.

(B.T. FALCONER)  
Director  
MANDATA Program Office

DEVELOPMENT PLAN

- 2 -

- 1(a) Finalise specification and development of LEAVE system. Trials in PSB and Education. (Available to all departments from February 1979).
- (b) Enhancements by March 1979
- . TF28 no.
  - . calculate entitlements of first year officers
- 2(a) Convert existing Phase 1 system (DATASTREAM) to the Burroughs 7700 computer by December 1978 for 12 existing client departments.
- (b) Enhancements by March 1979
- . enquiry facility
  - . expand data coverage to match SPR cards.
- 3 Finalise specification and development and implement using Burroughs 7700 computer a designation/salary/occupation sub-system equivalent to that currently available to existing Phase 1 system (DATASTREAM) by end November 1978.

---

By end of 1978 complete 1(a) + 2(a) + 3

By end of March 1979 complete 1(b) + 2(b)

---

- 4 Study team reports arising from:
- (i) Analysis of benefits attributable to Phase 2 MANDATA and identification of breadth and depth of automation in recording areas e.g. SPR, CRP, having regard for cost effective criteria.
- (ii) Analysis of impact on Personnel and Establishment sections and elsewhere due to the implementation of Phase 2 MANDATA. Identification of areas of change needed to procedures, records, organisation, staffing and training.

- (iii) Analysis of audit requirements for Phase 2 MANDATA.
- (iv) Analysis of Mandata Programme Office's subject matter repository requirements and procedures and MPO's subject matter relationship to the Board and departments.
- 5 Other related Phase 2 tasks to be considered:
- (i) Develop education program regarding the use of MANDATA aimed at departmental management.
- (ii) Develop ed. quals./skills sub-system.
- (iii) Develop further the organisation sub-system, e.g. to encompass FSE/programs.
- (iv) Develop a more integrated Phase 2 system
- . remove duplication of forms
  - . remove limitations caused by transfers between departments
  - . extend on-line data retention capabilities
  - . remove duplication of personnel data
- (v) Expand data coverage to match CRP data.
- 6 Continue to develop the Phase 3 MANDATA system.

SUMMARY OF FINDINGS BY COMPUTER SCIENCES OF  
AUSTRALIA PTY LTD<sup>17</sup>  
OCTOBER 1972

CSA concludes that the centralised MANDATA system as conceived, designed and planned is justified, is technically feasible, and is capable of being implemented generally in accordance with the schedule and costs estimated. In particular:

- . On the basis of the cost assumptions postulated, the system over the period to 1983/84 is economically justified. Even should delays of 12 months occur to the schedule and be compounded with an overestimation of savings by, say, a factor of two, the proposal remains one for which the tangible benefit/cost position is favourable.
- . Overall implementation planning has begun and this should be continued and monitored. CSA would recommend that the Board's officers formulate, as early as possible, formal management techniques to be used for project control and performance measurement.
- . The MANDATA system applies to the personnel/establishments areas with which the Board is intimately familiar. For this reason the functions to be performed are well appreciated. CSA considers, however, that the functional requirements of the system need to be stated explicitly, as this will assist markedly in providing the Board with a "base line" against which the development activity may be monitored and the eventual success of the system measured. Functional specifications likewise serve the development staff by providing the fundamental criteria against which design decisions are taken and tenders evaluated.
- . With the development of modern systems software, the functions of the "Processing Framework" are obtainable from currently available systems, including most, if not all, of the system security features required. The implementation of the "Framework" as described in the document referenced should therefore not be pursued.
- . The configuration and performance estimations presented constitute only a first level solution of the problem suitable for the planning stage. Further work must be planned by the ADP group to ensure that required performance will be achieved.

---

17. Computer Sciences of Australia Pty Ltd, *MANDATA - Review and Recommendations*, report to the Public Service Board, October 1972.

The MANDATA system envisages the use of modern equipment and programming systems. In particular a data base management system is to be employed. CSA observes that existing systems of this kind handle the work proposed.

A great deal of emphasis has been placed on system security; the real and psychological needs for which are appreciated. These needs can be met by utilization of available software facilities in conjunction with external physical and procedural measures together with suitable safeguards in the application programs.

The proposed system is dependent to a considerable extent on communications. Major costs are associated with interrogation and input terminal units and telecommunications charges. The efficiency, performance and utilization of these components should be closely monitored as opportunity for savings may arise as more information is collected on operational characteristics.

Data input to the system is a major problem. The related areas of data encoding, physical operation of terminals, training provisions, and error detection require concentrated attention. Good solutions will have profound effects on the practicability and economic benefits of the system.

The proposed phased development will prove valuable in breaking the effort into manageable parts. In particular Phase Two practical experience with the technology anticipated when combined with a suitable Field Test program, eliminates any necessity for a pilot test.

Not all the recommendations were fully complied with by the Board in that:

From the samples presented to the Committee, formal management techniques for project control and performance management are not adequate.

No overall functional requirements specification was developed.

The Board went ahead with the development of the Processing Framework.

The Board did not monitor communication developments closely enough to prevent the wasteful purchase of data-concentrator-units.

SUMMARY OF FINDINGS BY PA CONSULTING SERVICES PTY LTD  
JUNE/JULY 1977<sup>4</sup>

PA Consulting Services Pty Ltd issued their report in June 1977. The extracts below are not a complete summary of the report. We have selected quotations which are relevant to the Committee's present inquiry and omitted others that are not.

COST/BENEFIT ANALYSIS

We have reviewed and revised the March 1977 analysis. Major cost elements were assessed in fair detail and substantial contingencies added. Benefits of a direct clerical savings nature, and by way of management improvement were assessed by field discussions and assessment, and have been substantially increased. In summary we consider that:

- (i) The project as an investment, though long-term in its payback (some seven to eight years), is comparable with similar commercial computer systems in its benefit/cost ratio. This ratio is, in fact, above average when effects of labour escalation, and the value (which we have estimated) of management improvement are included.
- (ii) The savings are the most critical aspect of the project; their achievement requires commitment and effort from the start of implementation, and must be based on high-level decisions and actions in departments and the Public Service Board.
- (iii) The project, as an investment, is also critically sensitive to:
  - delays; one month costs \$0.5 million present value
  - system life; one year added/deducted is worth at least \$2.3 million present value.
- (iv) Consequently, commitment to the project once it is approved to proceed on the lines proposed, must be thorough and comprehensive.

---

4. P.A. Consulting Services Pty Ltd, *Review of MANDATA*.  
June/July 1977.

#### MINIMUM COST

The program, as now planned and scheduled, is consistent with a minimum cost objective, on the basis discussed with the Steering Committee.

The work structure and organisation of staff resources is soundly based, with a strong project orientation with clear objectives, and staged delivery of useful product system to meet departmental and service needs.

The main recommendations in this area are on management aspects over the next critical two to three years involving:

- Concentration on clearly defined tasks and staged goals, without distraction or diversion
- Planning and control of design and development aspects, such as documentation, quality and function performance of the products, and close management to restrict design changes to essentials
- Concentration on simplicity and selectivity of approach in design and implementation, to achieve minimum cost, not technical elegance
- Establishment of a project Board of Management with up to five representatives of key departments, at about permanent head level.

#### COMMITMENT

A decision to proceed on the lines planned for Mandata will require commitment:

- to provide adequate resources and to manage these so that delays are prevented;
- to accept a system life and utility of the functions provided for some ten years (ie say to the end of the 80's);
- to reorganise and to redeploy staff whose functions are eliminated or substantially changed, as rapidly and as effectively as possible.

#### SOME RISKS AND SENSITIVITIES

- Variations in detailed objectives, involving replanning redesign and redevelopment will increase development investment and delay benefits through slippage. Careful control of the planning and design phases, before commitment of significant programming resources to a particular stage will be vital.
- Variation in availability of the required manpower, during

the design, development and implementation phases will also impact schedule and cause deferred benefits and increased costs. The manpower resources must be controlled to the right mix of skill and numbers, availability and redeployment to reduce delays and idle time.

- The effect of extraneous tasks (not related to Mandata objectives) such as bureau processing and customer support must be contained and separated, as clearly as possible from the Mandata project team.
- Detailed design, development and implementation tasks should be concentrated on essentials, with simplicity, rather than complexity in approach as the objective.
- Regular reviews of progress to identify potential delays, and agree averting action is essential.
- Achievement of potential benefits will, in the ultimate, only arise from departmental users, not from the computers or their operations. Commitment to specific benefit objectives must be made by users, at high levels, as early as possible, followed by regular reviews by these same officers of progress to their achievement. This aspect should be covered explicitly in departmental planning of their implementation and operational tasks, and must be seen by them as their responsibility.
- Section D, (Review of System Capacity) gives details of likely capacity utilisation. It is important that use of the facilities is carefully planned and allocated, at the design stages, so that misuse of scarce capacity elements is prevented. Similarly where it is found that certain units are not required, these should be redeployed in the Service if at all possible.
- Given the sensitivity of the project to delays, and the need for concentration on essential objectives, we believe that the provision to Mandata of uninterrupted power supply facilities for the central computing unit should be reviewed, based on current and likely power failure experience and effects. Similarly consideration of transfer of the central unit to another site in Canberra should be very carefully assessed, in terms both of total costs involved in the transfer, and of the implicit costs and risks of delays arising from the move.

#### MANAGEMENT IMPROVEMENT OBJECTIVES

We interviewed a number of senior officers including heads of departments, inspectors responsible for the Personnel and Establishment functions and members of the Public Service Board.

We found that Mandata is generally anticipated to provide significant management benefits including:

- improved co-ordination and efficiency in personnel management,
- better planning of forward requirements,
- extension of manpower planning to achieve staff development appropriate to future needs,
- greater flexibility to cope with organisational changes,

The payoff was mainly described in terms of improved efficiency and the ability to raise the level of service. It was suggested that some aspects of service to the public are at risk unless personnel resources management is made more effective.

...We conclude that the potential management improvement benefits are significant.

It should be noted however that Mandata is an aid to management and the achievement of these benefits rests with the departments themselves.

#### STRATEGY OF IMPLEMENTATION

It is worth reiterating that Mandata can only aid the improvement of performance and does not in itself bring benefits to fruition. A number of steps needs to be taken to ensure that its full potential is realised:

- Identify several key prospects and concentrate initial resources on applying Mandata to gain tangible results.
- Ensure Mandata products reflect the wants of the users and are delivered on time.
- Keep the central theme simple, especially in the early stages.
- Define the benefits objectives clearly in quantified terms and have departments formally acknowledge that these are worthwhile and achievable, by them.
- Provide the support of the Australian Public Service Board and the Mandata project team to plan the implementation program and train departmental staff in personnel resource management.
- Offer an ongoing service to improve use of the system and conduct post audits into the benefits being derived.

#### IMPACT OF EXTRANEIOUS TASKS

For sound economic and related reason, the Mandata resources of staff and equipment are now, and will in the future, provide services which are extraneous to Mandata objectives.

An example of such a task is:

- supporting development and processing of systems for bureau clients such as the Departments of Capital Territory, and Immigration and Ethnic Affairs.

We appreciate fully the reasons for these tasks. They do, however, divert resources directly and also, and equally importantly, confuse priorities and distract attention from Mandata objectives. Consequently they will, if not closely controlled, impact the minimum cost objective, by delaying progress, extending schedules and overloading equipment.

#### DESIRABLE TO COMPLETE THE PROJECT

We consider that the program as planned and estimated represents a reasonable investment, with sound objectives. On the basis that it will be well managed, and that strong commitment at high levels in the Public Service is obtained and maintained, then the program should proceed.

PRODUCT NAME CROSS REFERENCE LIST

The list below shows product names used by PA Consulting Services Pty Ltd in their report and the corresponding names currently in use in the Mandata Program Office.

<u>CONSULTANT REPORT NAME</u>	<u>FUNCTION</u>	<u>CURRENT NAME</u>
Datastream Version 1	DOP Personnel and Establishment system with MANDATA forms and procedures	MANDATA Phase 1 (DOP) system
Datastream Extended	Production of reports on PSB B7700 computer	MANDATA Phase 1 (with improved reports)
Datastream Version 2	Procedural changes in use of system	MANDATA Phase 1 (with improved procedures)
Data Leave	Recording of leave entitlements	MANDATA Phase 2 (Personnel/Leave system)
Data Consolidate	Integrate Datastream and Leave into one system	MANDATA Phase 2 (integrated)
Data Alsai	Maintenance of salary and allowance data for designations	MANDATA Phase 2 (Designation/Salary sub-system)
Data Enhance	(a) Record updating on PSB B7700; (b) Enhancement of system to allow elimination of SPR Card recording; and (c) To discontinue the Board's CRP system	MANDATA Phase 2 MANDATA Phase 2 MANDATA Phase 3 (CRP)
Data Pay	Calculation of pay entitlements and link with Finance payroll and AGRBO systems	MANDATA Phase 3 (external linkages)

INTERDEPARTMENTAL COMMITTEE ON ADP

Terms of Reference

Membership

1. The membership of the Committee shall comprise a representative from the Public Service Board as Chairman, and representatives from the Department of Defence, the Postmaster-General's Department, the Treasury and CSIRO.
2. In addition, while consideration is being given to a proposal from a particular Department, a representative of that Department shall be a member of the Committee.
3. Representatives of other Departments may be co-opted as necessary at the discretion of the Committee.

Function

4. To co-ordinate, in collaboration with the responsible executive authorities, the introduction and development of automatic data processing in the Australian Public Service. This function involves to varying depths, depending upon particular circumstances, these more detailed matters:-
  - 4.1 The review of departmental plans, based on feasibility or other studies and cost/benefit assessments, for the introduction or enhancement of ADP systems and related data communications networks;
  - 4.2 The review of proposals for the acquisition of computer and associated equipment, other facilities including computer software and support services and the hire of computer time;
  - 4.3 The review of specifications for such equipment and services.
  - 4.4 The review of departmental tender evaluations including endorsement of the selection of successful tenderers;

- 4.5 The review of departmental requests to the responsible tendering authority for the issue of certificates of inexpediency in relation to the purchase of ADP equipment;
- 4.6 General oversight and regular review of the implementation of ADP policies and plans relevant to the Committee's function;
- 4.7 The co-ordination and rationalisation of the use of ADP facilities by the Australian Public Service;
- 4.8 Through the Board's ADP Division, the provision of advice to departments and where requested statutory authorities on the development and use of automatic data processing facilities;
- 4.9 The consideration and endorsement of ADP standards (including data communication standards) for use in the Australian Public Service;
- 4.10 Advice to the relevant Permanent Heads and/or the responsible tendering authority of the Committee's views and recommendations on any of the above matters;
- 4.11 The provision of advice to the Public Service Board on recruiting, training and other aspects of the employment of ADP staff;
- 4.12 The provision of advice on policy matters of an ADP nature involving the operations of Commonwealth Government administration;
- 4.13 The consideration of any matter relevant to the effective performance of the Committee's function.

Modus Operandi

5. The Committee may determine its own modus operandi including delegations as agreed with the Public Service Board's ADP Division.
6. The Committee will be serviced by the Board's ADP Division.

FURTHER DETAILS OF ESTIMATED COSTS AND BENEFITS

A. ESTIMATED COSTS AND SAVINGS ASSOCIATED WITH INTRODUCTION OF MANDATA SYSTEM (\$1000) AS APPROVED BY CABINET. THIS IS TABLE 1 OF ATTACHMENT A TO CABINET SUBMISSION ON MANDATA, FEBRUARY 1974

	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	TOTAL
<b>DEVELOPMENT COSTS</b>													
Site for Computer		250											250
Computing Equipment		551	4,062	1,591	560	146	83	83	26	26	26	26	7,186
Specially Developed Software			200										200
Design Staffing	815	1,619	1,492	979	767	308	215	237	256	276	299	322	7,589
Implementation Staffing		405	510	779	638	550	384	286	247	267	288	311	4,666
<b>TOTAL DEVELOPMENT</b>	<b>815</b>	<b>2,826</b>	<b>6,264</b>	<b>3,349</b>	<b>1,965</b>	<b>1,004</b>	<b>686</b>	<b>606</b>	<b>529</b>	<b>569</b>	<b>613</b>	<b>659</b>	<b>19,885</b>
<b>OPERATING COSTS</b>													
Special Account			24	24	24	24	24	24	24	24	24	24	240
Equip. Maintenance		41	199	378	442	462	486	505	528	538	563	578	4,720
Data Communications			380	633	759	759	759	759	759	759	759	759	7,085
Consumables			50	53	57	61	64	68	73	77	82	86	671
Data Entry Staff			663	911	1,054	1,214	1,393	1,593	1,721	1,962	2,119	2,409	15,039
Other Staffing	127	462	2,078	2,983	3,667	4,148	4,484	4,847	5,124	5,540	5,902	6,399	45,006
<b>TOTAL OPERATING</b>	<b>127</b>	<b>462</b>	<b>2,078</b>	<b>2,983</b>	<b>3,667</b>	<b>4,148</b>	<b>4,484</b>	<b>4,847</b>	<b>5,124</b>	<b>5,540</b>	<b>5,902</b>	<b>6,399</b>	<b>45,061</b>
<b>TOTAL COSTS</b>	<b>942</b>	<b>3,288</b>	<b>8,342</b>	<b>6,332</b>	<b>5,632</b>	<b>5,152</b>	<b>5,170</b>	<b>5,453</b>	<b>5,653</b>	<b>6,109</b>	<b>6,515</b>	<b>7,058</b>	<b>65,646</b>
<b>DISCOUNTED COSTS</b>													
(8% ref'd to 75/76)													
<b>SAVINGS</b>													
Staff													
Computing			1,535	5,371	9,687	13,016	14,547	16,287	18,212	20,341	22,720	25,420	147,136
Other			53	107	112	118	123	129	134	140	145	151	1,212
<b>TOTAL SAVINGS</b>			<b>1,588</b>	<b>5,478</b>	<b>9,799</b>	<b>13,134</b>	<b>14,670</b>	<b>16,416</b>	<b>18,346</b>	<b>20,481</b>	<b>22,865</b>	<b>25,571</b>	<b>148,348</b>
<b>DISCOUNTED SAVINGS</b>													
(8% Ref'd to 75/76)													
			1,588	5,049	8,325	10,285	10,584	10,915	11,241	11,571	11,903	12,270	93,731

Ratio - Discounted Savings to Discounted Costs = 1:92:1  
 Total Savings Exceeds Total Costs by \$82m  
 Savings Exceed Costs by More than \$5m p.a. after 1978/79

NOTES:

B. ESTIMATE OF MANDATA COSTS MADE  
AT DEC '73, ADJUSTED OCT '78 FOR  
WITHDRAWAL OF TELECOM/AUSTRALIA POST  
 (\$'000)

BREAKDOWN OF TABLE 3 IN SECTION 4.1

The figures of this table were calculated by the Public Service Board. Independent calculations by the Public Accounts Committee differed from them slightly but not materially.

	As approved by Cabinet <sup>50</sup>	Adjusted to 1977\$ (a)	100% over- heads on Staff Salaries removed	Allowance for Telecom and Austr- lia Post removed
<b>A. EQUIPMENT SITE AND SOFTWARE</b>				
Equipment	7180	7180	7180	5980 (b)
Site Preparation	250	398	398	398
DOP System	-	-	-	-
Consultants	-	-	-	-
Special Software	200	318	318	318
Ancillary	-	-	-	-
Interest	-	-	-	-
<b>SUB-TOTAL</b>	<b>7630</b>	<b>7896</b>	<b>7896</b>	<b>6696</b>
<b>B. DEVELOPMENT AND IMPLEMENTATION</b>				
Development Staff	7589	9500 (c)	4750	4750
Implementation	4666	5113 (c)	2557	1534
<b>SUB-TOTAL</b>	<b>12255</b>	<b>14613</b>	<b>7307</b>	<b>6284</b>
<b>C. OPERATIONS (12 YEARS)</b>				
Accommodation	240	240	240	240
Power	-	-	-	-
Maintenance	4720	6538 (d)	6538	5088
Data communications	7085	11266 (c)	11266	9200
Operating Staff	18006	16882 (c)	8441	8441
Data prep. staff	15039	14662 (g)	7331	4309
Consumables	671	759 (f)	759	759
<b>SUB-TOTAL</b>	<b>45761</b>	<b>50347</b>	<b>34585</b>	<b>28126</b>
<b>TOTAL</b>	<b>65646</b>	<b>72856</b>	<b>49788</b>	<b>41106</b>

50. Public Service Board, Cabinet Submission on MANDATA Attachment A, Table 1, February 1974.

Notes

(a) To adjust estimates of labour costs made in December 1973 to which they might reasonably have been if made in June 1977 we have multiplied the 1973 estimate by the following ratio:

$$\frac{\text{CPI June 1977}}{\text{CPI Dec 1973}} = \frac{229.6}{144.6} \approx 1.5878$$

The Board actually used a ratio of 1.59 in its calculations. (CPI is all groups weighted average for all States, 1966/67 = 100 as published by the Australian Bureau of Statistics).

June 1977 is the date of the PA report<sup>4</sup> and has been chosen as the base date for comparison of estimates made at different times.

(b) Cost estimated by the Public Service Board as the component of equipment cost originally in MANDATA to service Australia Post and Telecom is \$1,200,000.

(c) Cabinet figure contained 8 per cent per annum escalation for increase in staff costs. This has been removed prior to converting to 1977 dollars.

(d) Cabinet figure contained 2 per cent per annum escalation. This has been removed before converting to 1977 dollars.

(e) Although not directly a labour cost, it has been assumed that communications rentals rise in proportion to the CPI.

(f) 5 per cent per annum escalation removed from Cabinet estimate before multiplying by CPI ratio.

(g) After removal of the 8 per cent per annum escalation rate from the December 1973 figure, the Public Service Board used a factor of 1.7 rather than 1.59 to convert from December 1973 to June 1977 dollars because clerical salaries rose faster than the CPI over this period.

4. P.A. Consulting Services Pty Ltd, REVIEW OF MANDATA June/July 1977.

C.

**MANDATA 1978/79 COSTS AS AT MAY 31 1979 AND EFFECT ON TOTAL COSTS-TO-DATE (\$'000; 1977\$)\***  
(Calculations by the Public Service Board)

	1978/79 Cost	1978/79 Cost in 1977\$	Cost to 1977/78	Total to 1978/79	Estimate to complete*	Estimated Total
<b>(i) EQUIPMENT AND SOFTWARE</b>						
Equipment	240	240	6990	7230	573	7803
Site Preparation	190	167	107	274	158	432
DOP System			350	350		350
Consultants	4	4	85	89		89
Special Software	113	99	820	919	48	967
Ancillary	29	29	85	114	176	290
Interest			62	62		62
SUB-TOTAL	539	539	8499	9038	955	9993
<b>(ii) DEVELOPMENT AND IMPLEMENTATION</b>						
Development Staff	908	795	2845	3640	2240	5880
Departmental Staff			630	630		630
SUB-TOTAL	908	795	3475	4270	2240	6510
<b>(iii) OPERATIONS</b>						
Accommodation	140	140				
Power	35	35				
Maintenance	650	570				
Data Communication	100	88				
Operating staff	1135	994				
Data Prep. staff	404	354				
Overtime & travel	64	56				
Consumables	80	70				
Miscellaneous	372	372				
SUB-TOTAL	2679	2679	2923	5602	23535	29137
TOTAL	4013	4013	14897	18910	26730	45640

† CPI conversion ratio of 1.141 used for 12/78 to 7/77 conversion.  
\* to 1980/81 for development, equipment and software; to 1986/87 for operations.

51. Secretary, Public Service Board, letter to the Secretary, Joint Committee of Public Accounts, 25 June 1979.

D. BENEFITS ESTIMATED BY P.A. CONSULTING SERVICES PTY LTD IN JUNE 1977  
(\$'000; 1977\$)

	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	Total
1 Departmental - Record Keepers				3500	9250	11560	11560	11560	11560	11560	11560	11560	11560	11560	116790
2 Departmental - Other Staff				3712	3712	3712	3712	3712	3712	3712	3712	3712	3712	3712	40832
3 PSB Staff				138	312	387	387	387	387	387	387	387	387	387	3933
4 DOP Savings				180	180	180	180	180	180	180	180	180	180	180	1980
5 Service Bureau Savings				526	526	526	526	526	526	526	526	526	526	526	6875
6 PSB Computing Savings				83	83	83	83	83	83	83	83	83	83	83	958
7 Departmental - Other Systems				25	125	125	125	125	125	125	125	125	125	125	1275
8 Other Credits				465											465
9 Residual Value															4000
Direct Potential Savings				8164	14188	16573	16573	16573	16573	16573	16573	16573	16573	16573	177108
Discounted 10%				6131	9680	10292	9347	8502	7740	7027	6397	5800	5653	4806	83670
Cumulative Present Value				7506	17196	27488	36835	45337	53077	60104	66501	72301	78864	83670	
Management Information - Medium 1%					5900	11800	11800	11800	11800	11800	11800	11800	11800	11800	11800
Total Potential Savings				8164	20888	22473	28373	28373	28373	28373	28373	28373	28373	28373	283308
Discounted 10%				6131	13720	13956	16002	14555	13250	12030	10952	9930	10327	8228	130456
Cumulative Present Value				7506	21226	35182	51184	65739	78989	91019	101971	111901	122228	130465	

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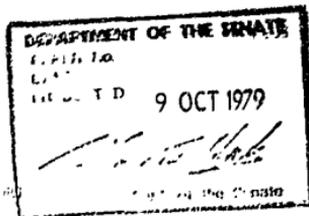
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