

Linking Inputs and Outputs: Activity Measurement by Police Services

Research Paper

*Steering Committee
for the Review of
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Service Provision*

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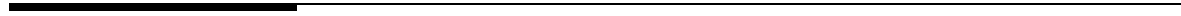
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Glossary

activity	A discrete unit of work undertaken by police. An activity is typically a subcategory of the core outputs of police agencies.
activity costing	The costing of an organisation's output, based on information derived from activity measurement. Typically, activity costing is a form of fully distributed costing, whereby all aspects of an organisation are costed in outputs.
activity measurement	The process of monitoring the allocation of an input (typically labour time) to a range of activities or outputs. This involves measuring the day-to-day activities undertaken by staff members within an organisation. Measurement can be achieved by the use of surveys, rosters and timesheets, among other tools.
activity survey	The collection of information on staff activities or tasks during a survey period. Staff complete a survey form by nominating how much time they spent on specific activities during a shift.
avoidable cost	All the costs that would be avoided if an agency no longer provided an output
inputs	The resources (including human resources, land, capital and materials) used to produce the outputs of an organisation
outcomes	The impacts on and consequences for the community as a result of government decisions and actions. Outcomes are often achieved through a combination of outputs and other actions (for example, legislation or regulation).

**output based
management/
budgeting**

A government-wide reform process that requires agencies to focus on the relationship between their outputs, the government funds appropriated to them, and the outcomes desired by government. Agency managers must clearly specify the nature and quantity of agency outputs, cost their outputs, and articulate the connection between the outputs delivered and government's desired outcomes.

outputs

The goods and services that an organisation produces and delivers for external users as a means of achieving its outcomes

rosters

A record of the nature of duty expected to be (or actually) performed during a given period. It provides staff with a broad list of general activities that they are rostered to undertake throughout their shift.

task

What an individual staff member is actually doing — that is, the type of duty associated with an activity

timesheet

A more detailed form of activity survey. Unlike activity survey forms (which list various activities, tasks and times), a timesheet requires separate storage of a large range of codes. Timesheets typically provide a greater level of detail than provided by activity surveys, and they are more frequently used.

Key messages

Government agencies provide a range of services that seek to address economic and social objectives. Their decision making can be improved if information is available on how resources are used and what outputs are produced. Activity measurement provides information on the allocation of inputs across outputs. Activity measurement is particularly relevant for services that use a single input to provide a range of outputs.

The experiences of Australasian police agencies provide some valuable lessons for other agencies wishing to improve their existing approaches or those wishing to employ activity measurement.

- There is evidence that activity measurement is proving a valuable aid in budget negotiations with governments, particularly to cost outputs. It is also proving useful to management as a tool for improving resourcing decisions.
- Each police agency faced choices when designing its measurement instrument, particularly when specifying activities and outputs, the detail of information to be collected, and the precision of the estimates.
- Australian police agencies experienced difficulty ensuring that the specified activities and outputs were comparable across jurisdictions. To facilitate comparisons of performance across jurisdictions, other agencies wishing to adopt activity measurement should first seek to develop a standard set of national outputs or a standard approach to activity measurement.
- Agencies that provided incentives to staff (for example, those that shared the benefits, minimised respondent burden, marketed the process, and/or provided appropriate support to staff) and introduced quality assurance processes, were best able to encourage high response rates and accurate responses.
- There are limits to measuring activities directly for the purpose of costing an agency's outputs. Specifically, agencies and their units should be held accountable for outputs over which they have control. Police do not have complete control over some activities that they report as outputs.
- Most agencies used activity surveys to collect information on activities that staff undertook during the sample period. Survey information could be more useful if rostered activities were distinct from those activities where staff had to respond.
- Differences in approaches to activity measurement did not significantly affect the associated costs experienced by most police agencies. The exception was NZ Police, which incurred a substantially higher cost. However, NZ Police collected considerably more data than did Australian police agencies.

A key area for further development is extending activity measurement to other areas of government services where labour contributes to the production of a variety of outputs.



1 Introduction

Government agencies provide a range of outputs that seek to address economic and social objectives. These outputs include the provision of law and order, emergency management and safety, health services, education, community services and public housing.

Governments and agency managers constantly face the challenge of prioritising competing objectives. Managers must choose those inputs that will meet their output objectives, subject to the constraints on the agency's budget allocation. Similarly, governments must choose the optimal set of outputs to meet their desired outcomes, subject to the constraint of their budgets. Such decision making can be enhanced with detailed and accurate information on how resources are used and what outputs are produced.

Many government agencies increasingly find their funding explicitly linked to the quantity of services (or outputs) they provide. This is a direct result of the general shift in government focus to output based budgeting. The requirement for government agencies to cost their outputs, along with the growing need for agencies to better understand their resource use, has heightened the need to implement effective management information tools. One such tool is activity measurement.

1.1 Activity measurement

Activity measurement provides agency managers and government with information that helps them better understand the relationships between inputs and outputs. Activity measurement involves monitoring the allocation of an input (typically labour time) to a range of activities or outputs. It is most useful for services where staff are responsible for the delivery of multiple outputs, rather than being dedicated to delivering a specific product. Activity measurement instruments include surveys, rosters and timesheets.

The information generated by activity measurement can:

- assist management in measuring the allocation of the agency's resources to specific outputs;
- cost the outputs of the agency, and assist government in meeting outcomes;

-
- assist line staff in better understanding how their work contributes to the broader, corporate goals of their organisation; and
 - provide the community with information on the range and cost of services that an agency provides.

The purpose of this paper is to highlight the recent lessons from Australasian police agencies' use of activity measurement. These lessons will allow police agencies to learn from one another, and will assist other government services for which activity measurement may be relevant. The emphasis is on design and implementation issues, as well as how the results can be used to improve internal management and external reporting. Guidelines for developing and implementing activity measurement for other areas of government are included within chapters 2 and 3.

1.2 Police use of activity measurement

Police services are the principal means through which governments pursue the following objectives:

- people can go confidently about their lawful pursuits in safety;
- people who break the law are dealt with under the law;
- road users behave safely; and
- safe custody for alleged offenders, and fair and equitable support to judicial services.

In meeting these objectives, police are involved in a diverse range of activities aimed, for example, at reducing the incidence and effect of crimes against people and property. These activities include investigating crimes, maintaining a visible and continuous profile, and providing community safety and education programs.

Police also respond to more general needs in the community — for example, assisting emergency services, mediating family and neighbourhood disputes, delivering messages regarding death or serious illness, and advising on general policing and crime issues (Criminal Justice Commission 1996). Police agencies throughout Australasia have widely adopted activity measurement systems to measure the allocation of labour (sworn officers, public servants and forensic staff) to these activities and outputs (box 1.1).

Box 1.1 Activity measurement instruments

There are a number of activity measurement instruments available to measure the allocation of resource effort (primarily associated with human resources) to the outputs of an organisation. Police agencies use activity surveys, timesheets and rosters, and each of these tools may be relevant to other services depending on the circumstances.

Activity surveys

An activity survey is primarily used to collect information on the activities and tasks that staff have undertaken during the survey period. Staff complete a survey form by nominating how much time they spent on specific activities during a shift. Staff time spent delivering activities can then be applied to an organisation's budget to determine the total cost of delivering each output.

Police agencies in Victoria, Queensland, WA, SA and Tasmania use surveys for activity measurement. They generally conduct the surveys over a one or two week period, once or twice a year.

Timesheets

Timesheets also record the activities and tasks that staff have undertaken during their shift. Unlike activity survey forms, timesheets require separate storage of a range of codes which correspond with various activities, tasks and times. Timesheets typically provide a greater level of detail than provided by activity surveys.

Staff complete a record for each half hour of duty undertaken. They code the 'task', along with the 'activity' associated with the task. Timesheets provide a continuous picture of activity within an organisation. A separate process is used to aggregate the detailed data.

NZ Police use timesheets for activity measurement.

Rosters

All police services use rosters to record those activities that police expect to perform during a given period. A rostering system provides staff with a single description for the general activities they are meant to undertake throughout their shift. The roster is amended if the activities completed on the day differ from those specified. The roster system provides a continuous picture of activity within an organisation.

NSW Police use roster data for activity measurement. They are expanding their roster system to include detailed information on activities and tasks that were actually undertaken.

Most State and Territory police agencies (including the Australian Federal Police, which is contracted to provide community policing functions for the ACT) have introduced activity measurement to overcome the limits of existing instruments. Some police agencies previously used other management information tools to obtain resource allocation information — for example, patrol logs and duty books/diaries.

These proved resource intensive and intrusive, and they were abandoned in favour of activity surveys.

Most police agencies found these other approaches unsuitable for monitoring inputs and output costing. Computer aided dispatch systems, for example, often record information for centrally allocated tasks only (for example, radio dispatch jobs), so tend to lack information on proactive work (such as community liaison) and detective work.

Likewise, rosters only provide information on activities that are planned or tasked for a given shift, so they lack information on incidents and outcalls. Moreover, there is no correspondance between tasks recorded on rosters and the incidents that staff are called to attend via radio dispatch jobs and station enquiries or while patrolling a community. As a result, these instruments do not provide police agencies with sufficiently detailed, accurate and comprehensive data for monitoring inputs and costing outputs.

The unsuitability of existing arrangements was a major factor in WA Police's adoption of activity measurement:

The introduction of activity surveys for WA Police was primarily due to the lack of information being generated by existing data collection instruments. The information generated by these systems was generally not representative of the outputs being generated by WA Police in an output based management environment ... (Blair, R., WA Police, Melbourne, pers. comm., 27 April 1999)

Police agencies use the results of activity measurement for a number of purposes, including output costing for Departments of Treasury, and internal planning and decision making (box 1.2).

Box 1.2 Linking activity measurement with internal planning

WA Police

When developing corporate priorities and targets, Regional Commanders and Portfolio Heads use the results of previous activity surveys to identify the level of effort required against each output (output mix) to address their policing priorities for the coming year.

The Annual Business Plan details the agency's policing priorities and targets, given the resources allocated to each of the outputs (which are indicated via results of activity surveys). Further, WA Police use activity surveys conducted throughout the planning year to monitor and report on targets set in the Annual Business Plan and to feed into the planning process for the forthcoming year.

Victoria Police

Activity surveys help Victoria Police integrate planning into budgeting and reporting. Activity measurement has promoted a more comprehensive accountability regime for output management by:

- making available data that can be used to measure performance levels, set targets and monitor priority setting at the operational and management levels;
- demonstrating to all levels of police the link between what work police perform and how government funds the organisation;
- reinforcing a customer focused planning process;
- providing data for executive managers to identify future policing needs;
- enabling the calculation of the full cost of outputs as well as the unit cost of each activity; and
- enabling flexibility in planning for the deployment of costs.

SA Police

SA Police will use activity data as part of their next environmental scan for the Business Plan. In addition, SA Police have planned a project to identify the drivers behind the key police service outcomes of crime reduction and community satisfaction. In this project, the agency will examine activity measurement data for utility in the broad planning context, particularly in the allocation of resources to various policing outputs.

Source: State and Territory police agencies (unpublished 1999).

Report on Government Services

Activity results can also feed into performance reporting of government services. The *Report on Government Services 1999* (SCRCSSP 1999) reports on the efficiency of output provision, and the effectiveness of those outputs in meeting

outcome objectives, for a range of government services across Australian jurisdictions. The performance reporting allows users to compare jurisdictions, bearing in mind that each government may attach different weights to often competing objectives (box 1.3).

Box 1.3 Objectives of the Report on Government Services

The Report on Government Services measures the performance of government services in education, health, justice, emergency management, housing and community services.

The Report provides data that enable ongoing comparisons of:

- efficiency — that is, how well organisations use their resources in producing services; and
- effectiveness — that is, how well organisations achieve their objectives.

Governments, government service agencies, the clients of these agencies, and the wider community can use this information to assess the overall performance of government services.

The framework of performance indicators is constructed around existing policy objectives of governments. Such a framework enables governments to assess the success of reforms undertaken to improve the delivery of government services, and it highlights the potential for further reforms.

Source: SCRCSSP (1999).

Police agencies have used activity surveys to improve their reporting of performance indicators in the Report on Government Services. They will now report, for example, detailed cost and efficiency data for four key areas of service delivery, rather than a single output. Activity measurement has assisted this process by directly linking activities with outputs.

1.3 Who else can use activity measurement?

Other areas of government for which staff are responsible for the delivery of multiple outputs, rather than being dedicated to delivering a specific product, may also benefit from activity monitoring. These areas include:

- emergency services (for example, metropolitan fire and ambulance services, country fire authorities and state and territory emergency services);
- health (where staff may treat different types of patients);

-
- corrective services (where officers are involved in containment and rehabilitation activities);
 - agricultural and environmental services; and
 - community services (where staff are involved, for example, in both child protection and family support outputs).

In the context of the Report on Government Services, there is scope to improve the performance data for other services. Effectiveness data, for example, are available for the four key objectives of corrective services: containment and supervision, offender care, reparation and rehabilitation. However, it has not been possible to break down expenditure against these objectives, and instead a single aggregate efficiency measure is reported. Education and emergency management agencies use similar broad level efficiency measures. Activity measurement may assist these government services in improving the accuracy of their reporting against specified outputs.

Activity measurement is not a universal solution to the challenges of gathering useful data to inform internal decision making, and external reporting. The usefulness of the exercise largely depends on the nature of the organisation (for example, the number of outputs individual staff members provide) and the information requirements of that organisation. Activity measurement may not suit those agencies that have simpler, more direct output cost measurements. In such cases, an activity measurement system may be unnecessarily complex and costly (both in terms of direct financial costs and the burden on staff).

Other areas of government services have already used activity measurement. The SA Government undertook an activity measurement exercise in 1996 to assist with the construction of a program budget for Community Health Mental Health Services. The costing methods used were quite similar to the methods that police agencies use (box 1.4).

1.4 Approach taken in this paper

This paper demonstrates how agencies may use activity measurement in output costing and internal management. It outlines the steps involved in the design and implementation of activity measurement, based on the experience of police services. It also identifies the perceived advantages and disadvantages of different approaches to activity measurement. The information presented is intended to assist government agencies (including police agencies) that are considering introducing or improving activity measurement

Box 1.4 Activity measurement for community services

SA Community Health Mental Health Services

The construction of a program budget for Community Health Mental Health Services in SA involved the collection of activity information from service providers and community based health information systems. A costing model was constructed to attach cost information to each service provided in the mental health program. The final program budget represented the first time that a breakdown of the activities and costs of individual services in community health in SA were available.

Each region collected activity information for the period January 1996 to June 1996 for the services identified in the mental health program. Information covered activity under the three main types of services: one to one, groups and community initiative services. Training was provided about different types of costs, and their importance in setting priorities and planning services. The costing method used a mix of bottom-up and top-down approaches. The bottom-up method provided a cost estimate based on disaggregated resource use data for the different inputs into the provision of each service. This approach is similar to the methods used by most police agencies to allocate direct and indirect costs. In contrast, the top-down method used aggregated data and allocation rules to apportion costs to services — this is similar to the methods used by some police agencies to apportion overheads.

WA Child Protection and Supported Placement Services

The WA Department of Family and Community Services currently use an activity survey to apportion expenditure data on superannuation, workers compensation, payroll tax, depreciation and umbrella costs to the key output areas of the department.

The survey is run three times a year and includes all field and administration workers in zone offices and special units across the state. It excludes central office staff. The survey runs for a two week period. Staff are required to allocate their time in 15 minute blocks to the relevant 22 lower level outputs, which make up six key output areas:

- Community Development, Education and Children's Services;
- Family, Youth and Individual Support and Parent Services;
- Family Safety Services;
- Crisis Support;
- Child Protection Services; and
- Care for Children.

Information can indicate whether the work relates to departmentally provided services or supporting and managing non-government service provision. The results over three survey periods are used to develop an average proportion of time spent in each output area. These are then used to apportion costs to key outputs for Annual Report requirements and Budget Papers for Treasury.

Sources: Peacock, S. and Edwards, D. (1997), and WA Department of Family and Community Services (unpublished 1999).

Chapter 2 focuses on the design issues of an activity measurement system, and chapter 3 examines the implementation issues. Chapter 4 discusses the relative costs and benefits of different approaches to activity measurement, and how activity measurement can be used to cost the outputs of organisations. Chapter 5 summarises the main findings and identifies areas for future research and development.



2 Design Issues

The objectives for activity measurement largely determine the design features of an activity measurement system, including the types of activities to be classified and recorded, and the timing, scope and coverage of the data. This chapter identifies some key issues for designing an activity measurement system. It recounts the experiences of Australasian police agencies, draws lessons from these experiences, and establishes broad guidelines for developing an activity measurement system.

2.1 Objectives of activity measurement

The objectives of an activity measurement system are to provide information for internal and external purposes (box 2.1).

Box 2.1 Activity measurement objectives

The objectives of activity measurement are to provide information to:

- *improve internal decision making.* Agencies may use activity measurement to inform management of the resources being allocated to outputs or processes (of the agency, business unit or cost centre), and thus to assist planning and resource allocation; and
- *improve external reporting.* Agencies may use activity measurement to cost their outputs for budgetary purposes, and to generate data for national and jurisdiction specific performance reporting purposes.

These objectives are not mutually exclusive; both may rely on activity measurement. The importance of each objective will determine the questions to be asked and the necessary data requirements. In turn, these determine the design features of the activity measurement system.

External reporting requirements may bear upon the specification of activities and outputs. Coordinating the specification of outputs and design features across jurisdictions at the earliest stages of the activity measurement system's development can avoid the need to change established output specifications or developing concordances between systems. The benefits to agencies and governments are the

improved service delivery that results from increased transparency and accountability.

2.2 Information requirements

As discussed in chapter 1, an agency will require activity measurement when existing data collection instruments cannot satisfy the necessary information requirements. Alternative data sources will influence the chosen type of activity measurement system.

Specifying activities and outputs

The specification of the agency's outputs and activities is an important aspect of activity measurement. The WA Department of Treasury (1996) listed criteria for specifying an output.

- Outputs are the final external goods and services, not a process.
- Agencies should have sufficient control over outputs to enable them to be held accountable for their delivery. Where agencies do not have sufficient control over outputs (for example, police agencies do not directly control all outputs because often their primary activity is to respond to incidents), outputs should be specified in a manner that allows the agency to control costs.

In contrast, activities describe the tasks, incidents and events that staff undertake, or the processes that an agency uses to deliver outputs. Output based activity information can be used in output costing.

The objectives of activity measurement have implications for how an agency should specify outputs and activities. Output budgeting — an important external reporting requirement for many agencies — is intended to improve strategic decision making and resource allocation (WA Department of Treasury 1996). An agency is held accountable to government by specifying its outputs and being responsible for its achievements.

Where the objective of activity measurement is to improve the decision making and resource allocation among an agency's units (business units or cost centres), the agency needs to specify activities and outputs for which senior management can hold the unit accountable. The whole agency is still externally accountable if the outputs of individual units can be aggregated to give the agency's outputs.

Measuring activities and outputs

In addition to the internal and external reporting objectives of the agency, the agency's or unit's type of work will have implications for timing the activity measurement. For those agencies or units whose actual activities do not significantly differ from the activities planned by management, it is immaterial whether the activity information is gathered before or after the occurrence of the activity.

However, a number of agencies (such as the police and emergency services) have rostered tasks that can substantially differ from their actual activities. Firefighting personnel, for example, may be rostered to undertake training duties but need to respond to a fire or other incident.

The information requirements of these organisations depends on the objective of the activity measurement. If the agency's primary objective is to improve decision making, both *ex-ante* and *ex-post* reporting is required. Such information indicates the resources allocated to rostered activities and the amount of resources actually used to respond to incidents. If the objective is to report on actual activities undertaken during a given period, then an *ex-post* measurement of data may be sufficient.

Measuring when activities occur

Once an agency knows its information requirements and chooses an approach for specifying outputs and activities, it must determine the required level of data detail. Is the agency interested in when an activity was undertaken throughout a shift (day, week or otherwise), for example, or simply in how much time was spent on the activity?

The level of detail about time largely reflects the objectives of the activity measurement exercise. For external reporting purposes, information on the proportion of time spent delivering outputs is generally sufficient. Information on when staff undertake activities is unlikely to add value. However, such information could assist management with resourcing issues, by answering questions such as:

- when do peak periods occur during the day, week or month?
- are some activities more or less likely to occur at certain times?

For police services, rosters may provide a sufficient indication of peak and lull periods. However, activity surveys provide greater accuracy and detail because they are based on *actual* resource use rather than *expected* resource use. This is an

important design issue, with significant implications for both the respondent burden and the level of detail that can be collected on other items (such as activities and tasks).

2.3 Data collection issues

Sample design

After identifying information requirements, the next step is to examine the agency's available information sources. The nature of work for business units or cost centres may be such that they can directly assign their costs without collecting additional information. Rosters are likely to provide a reasonable indication of a school teacher's work, for example, and an additional data collection may not be necessary.

If additional activity information is needed, the agency would need to determine the scope and coverage of the information collection.

- Should all or only some of the staff be surveyed?
- Should staff be surveyed together or in separate blocks?

The decision to survey some or all staff recognises the tradeoff between sampling error and cost when designing and implementing a system. Costs include the financial costs of establishment and administration, and the burden placed on staff. The agency must choose between the additional cost of expanding the sample size and the additional benefit of improving the precision of estimates.

The choice of sampling technique is partly influenced by how an agency has organised its units and cost centres, the activities of those units and cost centres, and the primary objective of the measurement exercise. Police agencies, for example, organise staff into specialist functional units (such as the Criminal Investigation Department and corporate services) or area based commands. If the primary objective of the activity measurement exercise is to cost outputs for output based budgeting, the agency can confine measurement to operational units, because only these units deliver outputs to government. Moreover, the inclusion of non-operational staff or units within a sample may overestimate the costs of outputs and lead to a misallocation of resources (section 4.4). If the primary objective is to use activity measurement to obtain information on internal processes, the agency may require activity information disaggregated by individuals or certain groups within the organisation.

Timing and frequency

The timing and frequency of collecting activity information are also important. There are two approaches:

- measuring staff activities on a continuous basis throughout the year; and
- measuring staff activities using a snapshot approach (for example, a survey).

Depending on the system used, the continuous monitoring of staff activities throughout the year may involve higher costs, both in managing the system and the data generated, and in placing an increased burden on staff (see chapter 4).

Measuring staff activities on a continuous basis provides internal management with a regular and (if appropriately structured) timely flow of activity information. Such a system can facilitate an immediate management response if necessary. However, those agencies that use activity measurement primarily to estimate output costs may find little value in the additional information generated via a continuous approach.

Agencies that decide to use a snapshot survey approach to activity measurement must decide how often to undertake the survey. Conducting an activity survey at least twice a year allows agencies to focus on:

- a typical period — a period of time (day, week, month) during which workload is representative of most periods. Such periods are notable for their lack of unusual events that may affect the work undertaken by the agency; or
- an atypical period — a period of time during which workload is not representative of most periods. Such periods are characterised by unusual events that may affect the level and/or mix of work undertaken by the agency.

Surveys conducted during typical periods indicate the amount of time that staff spend on specific types of activities throughout the majority of the year. Surveys conducted during atypical periods may indicate the impact (if any) of an unusual event on the level and mix of activities.

The nature of the work undertaken by police services can potentially vary with events or incidents that are outside the control of the police (for example, school holidays or a major sporting event). Similar issues would arise for other government services. Fire services, for example, are more likely to attend bushfires during periods of high temperatures and dry weather (such as summer months) than at other times throughout the year. In contrast, the outputs delivered by other government services may not vary significantly enough to warrant measuring activities at different times throughout the year.

Collection strategy

The two main options for collecting activity data are:

- manual collection via paper forms (for example, survey form or timesheet); and
- automated collection using a computerised database (for example, a database that links electronic rosters, computer aided dispatch and electronic-based incident reporting systems).

These approaches are characterised by different fixed and variable costs. A manual collection is more labour intensive and can be expected to involve low set-up costs but higher operating costs. In contrast, an automated electronic collection can be expected to involve higher set-up costs and lower operating costs. The manual collection of activity data is generally feasible for activity measurement that generates a relatively small collection of information. It cannot be expected to handle a large volume of data cost effectively. An automated process that electronically collects information may be more appropriate for securing a large volume of data, particularly when the collection is to be repeated over time.

In the case of police services, almost all jurisdictions rely on the manual collection of activity information via paper forms. This is seen as an interim approach until agencies adopt alternative electronic mechanisms. These mechanisms include the use of laptop computers in patrol cars, electronic patrol logs and hand-held mobile data terminals, which some English police services recently adopted (box 2.2).

Box 2.2 **Hand-held mobile data terminals for an English police service**

Mobile data terminals are a recent innovation for police services in the United Kingdom. These hand-held terminals provide real-time wireless data communications between a Command and Control Centre and foot patrols, allowing the immediate dispatch of officers to incidents, and the recording of officer activity.

In July 1998, Cleveland became the first English police constabulary to provide its beat officers with a one-piece, hand-held, mobile data terminal. As well as being used for dispatch purposes, mobile data terminals are part of a plan to make detailed costings of individual police activities. The Cleveland constabulary has found that the system allows the analysis of response information, type of incident and location.

The terminals replaced paper forms, which Cleveland officers used to record major activity within 15 minute periods. Mobile data terminals automatically measure activity when it happens, record the information via status codes, and transmit (around the clock) straight to the Command and Control Centre system. Results are current, and the data are used for Cleveland's activity costing program. The aims are to improve services to the local community and to determine the costs of service delivery.

Source: <http://www.ram.co.uk/press/clevehnd.htm>

Other benefits of an automated electronic collection include:

- the potential to supplement existing information technology systems that generate resourcing information;
- the likelihood of greater precision (given that built-in auditing devices involve less chance of human error); and
- reduced turnaround time (given that a systems based approach reduces the time between recording the information and accessing results).

The final decision will largely depend on the objectives of the activity measurement exercise. For the purposes of external reporting, the manual collection of a relatively small volume of data would be sufficient. For the purposes of internal decision making, which may require the collection of large volumes of data, an electronic automated collection may be more effective.

2.4 Australasian police approaches to activity measurement

Australasian police agencies differ in their approaches to activity measurement. These differences reflect variations in policy objectives and reporting requirements.

Rationale for introducing activity measurement

As discussed earlier, the two key objectives of an activity measurement system are to provide information to improve internal decision-making and external reporting purposes (box 2.1). Most police agencies have developed and introduced activity measurement for external reporting — that is, to better cost their outputs for State budgets and reporting to Treasuries. Police agencies in Victoria, Tasmania, WA and SA, for example, use activity surveys to collect information for a range of output groups and outputs that have been agreed with governments (box 2.3).

Box 2.3 **Police outputs and output groups**

The various services that police deliver to the community can be classified into output groups. Individual police outputs or activities tend to be similar across jurisdictions, but there are differences in how agencies aggregate such outputs and activities to form output groups. The following output groups are representative of the core areas of police work:

- community safety and support;
- crime investigation;
- road safety and traffic management;
- emergency response and management; and
- services to the judicial process.

Each output group contains a variety of individual outputs and activities. Police also provide a variety of internal services (such as training, leave and administration), which are either regarded as 'internal support functions' or linked to output groups (for example, general correspondence for crime investigation) to provide a complete picture of police time.

In contrast, Queensland Police initially trialled an activity survey to provide management with information for internal decision making (although management also used this information to cost outputs). Most agencies now view the output costing function of activity measurement as an adjunct to its use as an internal management tool. Agencies are increasingly using activity data to inform internal planning and resource allocation processes.

Approaches and instruments

Victoria, Tasmania, WA and SA

The survey forms of police agencies in Victoria, Tasmania, WA and SA include a combination of individual outputs and time spent working. This approach to activity measurement typically records the following unit record information:

- which outputs police actually delivered throughout their shift;
- when police delivered these outputs (only for Tasmania Police); and
- how much time police spent delivering these outputs.

Consider an officer who completed the following activities and tasks throughout the first half of their shift:

- 8.00 am – 10.00 am: preparation of brief and presentation of evidence at court in relation to a sexual assault charge;
- 10.00 am – 11.00 am: investigation of an assault; and
- 11.00 am – 12.00 pm: patrolling for traffic offences.

Table 2.1 illustrates how this officer would complete an activity survey in these jurisdictions.

Table 2.1 Collecting information using the Victorian, Tasmanian, SA and WA approaches to activity measurement^{a, b}

Output groups and outputs ^d	1 st hour of shift ^c			2 nd hour of shift ^c			3 rd hour of shift ^c			4 th hour of shift ^c		
	20	40	60	20	40	60	20	40	60	20	40	60
Crime investigation												
– Investigation of personal crimes							✓	✓	✓			
– Investigation of property crimes												
Judicial support												
– Presentation of evidence			✓	✓	✓	✓						
– Preparation of brief	✓	✓										
Road safety and traffic management												
– Traffic patrol										✓	✓	✓
– Random breath tests												

^a The survey forms of police agencies in Victoria, WA and SA include the total hours taken to deliver specific outputs (although differences exist in terms of how these hours are broken down: Victoria Police use 30 minute blocks; WA Police use 20 minute blocks; and SA Police use 15 minute blocks). The survey form of Tasmania Police lists the actual times of day at which outputs were delivered. ^b This table does not accurately represent the detailed information provided under the SA Police survey, which involves a far greater number of pages per day compared with other activity surveys. ^c The 'hours of shift' listed here do not comprehensively represent the activity surveys of most jurisdictions, which tend to list all hours worked in a shift/day (including overtime). ^d Output groups are indicated by bolded text. The individual outputs that correspond with these output groups are not bold. See appendix B for samples of such surveys.

Sources: State and Territory police agencies (unpublished 1999).

Given that output based budgeting is the primary objective of the data collection for Victoria, Tasmania, SA and WA, the instruments collect information on staff time spent delivering individual outputs (based on the output groups of each individual

jurisdiction). As a result, the instruments collect information on what staff actually did during a survey period. Thus, the information collected does not distinguish between rostered activities and unplanned incidents or events.

The numbers of output groups, outputs and time categories differ across jurisdictions, as does the length of the survey for each shift or day (table 2.2).

Table 2.2 Numbers of daily features of survey forms on police activity, by jurisdiction^a

<i>Features</i>	<i>Vic</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>
Broad output groups ^b	8	8	11	7
Outputs or activities ^b	77	40	126	48
Time periods	20	30	96	48
Length of survey (pages)	2	2	9 ^c	1

^a Includes the daily numbers of output groups, outputs or activities, and time periods available to a staff member required to complete an activity survey. ^b Includes internal support functions such as 'administration', 'leave' and 'other'. ^c Includes five pages for normal working hours and four additional pages for overtime.

Sources: State and Territory police agencies (unpublished 1999).

The output based nature of activities defined by these jurisdictions does not indicate the amount of time spent on activities for specific, individual offences. The 'amount of time spent investigating property crimes' will be recorded, for example, but not the type of crime involved (such as robbery). The exception is SA Police, which collect data for 126 activities just for generalist police. Most data items usually relate to offence categories such as homicide and assault.

Sample design also differs across jurisdictions. Police agencies in Victoria and Tasmania use a census (of operational and operational support staff) for their surveys. In contrast, WA Police sample about 40 per cent of operational and operational support staff, which they consider provides a reasonably accurate estimate of the characteristics of the entire police force. SA Police samples its workforce (both operational and non-operational staff) on a rolling basis to ensure that all staff are surveyed within a given year. Appendix A provides a summary of the key features of each jurisdiction's sample.

The sampling techniques employed by police agencies in WA and SA are based on clusters or strata. Groups of respondents are chosen according to work centres, stations, regions, districts and type of employment (for example, members, public servants and forensic staff). SA Police, for example, selects country and metropolitan service areas for participation in the survey in different seasons and time periods.

Each jurisdiction collects information for a one or two week period every year. Victoria Police and Tasmania Police have focused on typical weeks, whereas SA Police and WA Police have conducted their activity surveys during typical and atypical weeks. WA Police concluded that:

Although the overall workload for police increased (during an atypical week), the mix of activities being delivered did not change significantly. Thus, moving to a continuous monitoring system (which would capture data for both typical and atypical weeks), would arguably provide minimal additional information on how police officers were spending their time ... (Blair, R., WA Police, Melbourne, pers. comm., 27 April 1999)

These jurisdictions currently rely on paper survey forms to collect activity information, although all envisage the future adoption of automated, electronic mechanisms for data collection. As SA Police pointed out:

SAPOL recently purchased some hand-held devices in preparation for our next survey. Some initial programming exploration has begun and we expect a test device to be ready by the end of 1999. These devices would directly replace our paper form and are likely to be much more user friendly, hopefully reducing some of the burden on staff. Most importantly, these devices would reduce the turnaround time on results, as data collation and processing would be almost non-existent ... (Humphries, J., SA Police, Melbourne, pers. comm., 27 July 1999)

New Zealand

The timesheets used by NZ Police generate similar information to that from an activity survey. However, the NZ Police system differs to the activity surveys used by most Australian police agencies in two fundamental areas:

- the activities of all staff are measured every day of the year; and
- more detailed information is collected on activities and tasks.

The use of timesheets (in combination with a booklet explaining the codes for tasks and activities) allows relatively economic recording of a high level of detail (see Appendix B for a sample timesheet).

The NZ Police approach defines tasks as what staff are doing (for example, patrolling), and classifies activities as the purpose of the task, defined in terms of offence codes, incident types or service areas (for example, robbery). The timesheet approach allows the recording of a large number of activity–task combinations (table 2.3).

Table 2.3 Number of daily features of activity timesheet forms of NZ Police^a

<i>Features</i>	<i>Number</i>
Activities	307
Tasks	107
Activity–task combinations	12 751
Time periods	10
Pages (length)	1

^a Includes the number of activities, tasks and times available to a staff member required to complete a timesheet.

Source: NZ Police (unpublished 1999).

The broad range of information needs may partly explain the large volume of information collected by NZ Police. NZ Police activity information is currently required to:

- meet legislative requirements by allocating hours and subsequently expenditure to a number of output classes;
- support many aspects of performance measurement;
- meet the requirements of a wide variety of business needs (for example, financial management and performance management);
- provide a management and tactical delivery tool for policing services, such as directed patrolling;
- develop a better database of information for personnel planning; and
- provide data for external auditors.

The experience of NZ Police illustrates the tradeoff between the need for detail in meeting these objectives, and the cost of collecting and analysing that level of detail. (Chapter 4 provides a more detailed discussion of the costs incurred by NZ Police and other jurisdictions through their respective approaches to activity measurement).

Queensland

Queensland Police survey the activities of all operational and non-operational staff to generate information on resource allocation. However, unlike the approaches adopted by Victoria, Tasmania, WA and SA, the Queensland approach collects more information on individual activities and tasks. This occurs because it distinguishes activities from tasks, whereas the activity surveys of Victoria, Tasmania, WA and SA define outputs as a combination of activities and tasks (box 2.4).

Box 2.4 Defining police activities and tasks

The activity measurement systems of Queensland Police and NZ Police measure a highly detailed combination of activities and tasks as a means of monitoring resource allocation.

Under the Queensland Police approach, ‘activities’ are the incidents, offences or events to which police officers attend — that is, an activity is the category of the work being undertaken (for example, homicide, assault, robbery and drug offences). Activities are typically subcategories of the core outputs of police agencies. In contrast, ‘tasks’ are what individuals actually do — that is, a task is the type of duty associated with an activity or incident (for example, arrest, investigation, caution and court appearance).

An activity–task combination integrates activities and tasks to describe an event such as investigation (task) of a homicide (activity). These combinations would be classified as individual outputs or activities under the survey approach of police agencies in Victoria, Tasmania, WA and SA.

Queensland Police record the amount of time spent on each activity according to the associated task. Unlike the activity survey forms of police agencies in Victoria, Tasmania, SA and WA, the form adopted by Queensland Police does not separately identify ‘hours of shift’. Rather, it collects more information on the task associated with the activities that police undertake (for example, the amount of time spent at court in relation to a homicide charge). This level of detail is shown in table 2.4.

Table 2.4 **Number of daily features of activity survey of Queensland Police^a**

<i>Features</i>	<i>Number</i>
Outputs	6
Activities	37
Tasks	7
Activity–task combinations	166
Pages (length)	1

^a Includes the number of activities, tasks and activity–task combinations available to a staff member required to complete a survey. Times are not included because staff record only the amount of time that corresponds with an activity–task combination.

Source: Queensland Police (unpublished 1999).

Queensland Police are able to provide increased detail on activities and tasks by not separately categorising time on their survey forms. As a result, the survey forms are not restricted in the amount of alternative information they can collect (see Appendix B for a sample survey).

Consider the previous scenario of an officer undertaking a number of activities and tasks throughout the first half of their shift. The Queensland Police approach to activity measurement would collect this information as shown in table 2.5.

Table 2.5 Collecting information using the Queensland approach to activity measurement

<i>Activities</i>	<i>Associated task</i>							
	<i>Investigation</i>		<i>Court</i>		<i>Patrol tasked</i>		<i>... etc.</i>	
	Hrs	Mins	Hrs	Mins	Hrs	Mins	Hrs	Mins
Homicide								
Assault	1	00						
Sexual assault			2	00				
Traffic patrol					1	00		

Source: Queensland Police (unpublished 1999).

Using this approach, Queensland Police can meet external reporting requirements, and maximise the amount of detailed information on activities and offences for internal planning purposes. As with the activity surveys of Victoria, SA, WA and Tasmania, the Queensland Police approach records the amount of time that staff actually spent on activities. It does not separately identify rostered activities and unplanned activities where staff were required to respond.

New South Wales

NSW Police use rosters to report on rostered activities only (that is, the activity on which staff are expected to spend most time). Their activity measurement does not account for either unplanned events or a range of untasked duties, except to the extent that the supervising officer may alter rosters at the end of a shift. The duty code may be changed if the actual activity varies from the expected activity.

NSW Police are often required to provide only a single roster code for an entire shift's activities. Where staff are expected to perform more than one activity during a shift, they record only the code of the primary activity. The primary activity is the one on which most time was spent.

NSW Police recently computerised their roster system, and they use e-mail/Intranet facilities to upload each location's roster to a central repository. This allows the advantage of computer processing. Information is available within a few days of submitting returned rosters.

Information generated by the roster system is used for output costing and, by management, for tracking budget and resource allocations. Given that the roster codes have been used in the past for payroll purposes, the same information is used to calculate the number of hours worked delivering outputs, as well as the costs of outputs. Overhead costs are directly apportioned.

The NSW Police roster system involves 308 roster duty types, which form 41 roster duty categories. This allows further aggregation up to 30 activities (through a combination of roster duty category and cost centre). These roll up to eight services within five programs (or four programs for budget and external purposes) (table 2.6).

Table 2.6 Number of daily features of roster system for NSW Police

<i>Features</i>	<i>Number</i>
Activities	30
Roster duty categories	41
Roster duty types	308
Pages (length)	1

Source: NSW Police (unpublished 1999).

The current NSW Police approach to activity measurement is able to provide considerable detail in the types of activities that staff undertake. As a roster-based system it has the advantage of imposing few additional costs on staff. However, because staff are required to indicate only the one roster code for each shift, and because rosters do not record a range of activities associated with events or incidents, the system provides only a partial picture of police activities. NSW Police are moving to a more sophisticated electronic roster which will involve a larger number of standardised codes. Some of these codes will identify a mix of activities (rather than just one) with different relevant weightings.

ACT and NT

The Australian Federal Police are now in the early stages of developing an activity survey to conduct on a regular basis. They are also developing an Enterprise Information System, which is a data warehouse that sits outside the Police Real-Time On-line Management Information System (PROMIS) and the SAP Human Resource and Finance System. The Enterprise Information System will use percentages to determine the time spent on specific activities. The activity surveys will be used to validate these percentages. Ultimately, the Enterprise Information System is likely to draw together information generated via rosters and computer-aided dispatch as a means of providing a continuous account of police time. NT Police will implement PROMIS, but will not use activity surveys.

Contracting out

Police agencies faced a number of options throughout the design and development stages of their activity measurement system. They had to decide whether to design and develop the system fully in-house, or to contract out part of the process.

Almost all police agencies internally developed those areas of the activity measurement system for which they had a comparative advantage (such as the classification of police activities and outputs to be costed, and the scope and timing of the process).

Some agencies contracted out stages of the process for which they did not have the relative expertise, including survey design and data processing. Queensland Police, for example, tendered out their survey to a private operator, which prints the survey forms, scans the results of the completed forms, and processes the data. The data are returned to Queensland Police within a week of the survey being completed. Victoria Police used an external contractor to design their diskette software and the associated database, and to transfer the results from these disks to the database. Other police agencies processed their survey forms internally.

Improving the concordance of activity measurement systems

As outlined in section 2.1, agencies may use activity measurement to generate data for national performance reporting purposes. Police agencies are hindered in meeting this objective by the fact that they have developed significantly different ways of aggregating activities and outputs into output groups.

This arose because individual outputs were agreed through a bilateral process between line and central agencies within each jurisdiction (reflecting policy priorities). Less emphasis has been placed on coordination in terms of developing standard policing outputs (or a standard approach to activity measurement, which would allow information to be aggregated into a standard set of policing outputs).

To overcome this problem, Australian Police agencies undertook a mapping project to link the individual outputs of each police agency with a standard set of national policing outputs (table 2.7). The aim is to be able to report comparative performance information for the Report on Government Services covering:

- community safety and support;
- crime investigation;
- road safety and traffic management; and
- services to the judicial process.

Table 2.7 **Concordance of individual police agency outputs with nationally agreed service delivery areas**

<i>Service delivery area</i>	<i>NSW</i>	<i>Vic</i>	<i>Qld^a</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>
Community safety and support^b	Community support	Crime prevention and community support programs	Proactive problem oriented policing Combatting organised and major crime Preservation of public safety	Community support, crime prevention and public order ^c Response to offences Emergency management and coordination	Community police services Emergency response management and coordination	Policing support to the community Major incident and emergency management	Community services	Social order Emergency management
Crime investigation	Criminal investigation	Crime investigations	General duty crime detection, investigation and prosecution	Investigation of offences ^d	Crime management	Crime detection and investigation	Investigations	Personal safety Property crime Illicit substances
Road safety and traffic management	Traffic services (includes infringement processing)	Road safety and road trauma reduction	Traffic policing, speed management and camera operations	Traffic management and road safety ^d	Traffic services	Traffic law enforcement and road safety (includes infringement processing)	Road and traffic services	Road safety
Services to the judicial process	Judicial support	Supporting the judicial process	na^e	Services to the judicial process	Criminal justice support	Support to judicial services	Prosecutions and court services	na^e
Other services	Firearms registry	Information and licensing services	Ethical standards and public accountability	Regulatory and information services	Ministerial support services	Protection of primary industry and fisheries resources Ministerial support and information services	Commonwealth support	..

^a Proposed by Queensland Police, pending confirmation by Queensland Treasury. ^b Includes station operations, communications, general and targeted patrols. ^c Includes emergency response readiness. ^d Includes brief preparation and processing. ^e Included with *crime investigation* or *road safety and traffic management*. .. Not applicable. **na** Not available.

Sources: State and Territory police agencies (unpublished 1999).

Overheads (including finance, human resources, education and training, audit, information technology, legal services, public affairs, property and fleet management, purchasing and supply, and other general management) are distributed across the service delivery areas to show total resource use.

Although a mapping project will partly overcome the problem of different specification of outputs and activities, as other service areas explore this tool it may be preferable to coordinate their introduction of activity measurement by:

- developing a standard set of national outputs for agencies; or
- developing a standard approach to activity measurement whereby agencies could aggregate their data to report against a set of standard outputs.

2.5 Conclusion

The review of the approaches employed by police agencies in Australasia indicated that agencies faced a number of decisions when designing their activity measurement systems. Decisions in each jurisdiction reflected differences in reporting requirements, as well as other concerns such as the availability of data from existing sources.

Output based budgeting seeks to improve the efficiency of agencies by making them accountable for the outputs that they produce. Activity measurement systems record the amount of time that staff spend attending to a range of activities. Activities are defined to correspond with the outputs of the agency in output based budgeting. Information collected for internal reporting requirements is most useful if the activities describe the outputs of the business units or cost centres. Agencies therefore faced a choice of how to specify those activities that most closely resemble the outputs of the agency and the outputs of its business units and cost centres.

One choice involved tradeoffs between the cost of activity measurement, and the detail of information and the precision of estimates. The NZ approach to activity measurement offers the most detail in terms of activities and tasks. This approach, along with the proposed NSW instrument, collected information on a daily basis. In contrast, most Australian police agencies collected information on activities and tasks at relatively broad levels, and only for a limited period of the year. The NSW instrument provided the least precision and the least coverage of activities and tasks. These variations reflected, in part, differences in reporting requirements. With one exception, Australian police agencies initially collected information to meet output

budgeting requirements. These variations also reflect differences in the desired level of detail and accuracy.

Agencies must also choose between obtaining detailed data on activities and tasks, and measuring the times at which these activities and tasks were undertaken. Collecting information on times when an activity was undertaken throughout the day reduces the scope for collecting detailed information on the activity and associated task. The Queensland approach presented a relatively economic method of collecting time related information without compromising the detail of activities and tasks. In contrast, other Australian jurisdictions collected time information in a way that hinders collecting other information on the same survey form.

Agencies must also choose between the cost of measurement and the precision of the estimates. In contrast to NZ Police (which reported on every staff member for every day of the year), Australian police agencies preferred to survey or sample for one or two weeks per year. A snapshot approach is likely to involve lower costs although it may generate less precise information given that it does not provide a constant account of police activity. The issue is about how representative a snapshot day/week is of typical police work. The choice again reflects differences in reporting requirements.

Similar choices relate to the type of data collected on activities and tasks. Every police agency collected information on the activities and tasks undertaken after the event occurred. This is appropriate where the primary objective is to cost outputs for the purpose of external reporting. However, if the objective is to improve accountability of individual units or cost centres, then:

- information needs to be collected on the activities and tasks that staff within these units or cost centres are rostered to undertake, and the activities and tasks actually undertaken; and
- the activities and tasks of agencies and cost centres need to be specified as individual outputs, with business units or cost centres having control of the level of delivery of outputs, or where such outputs involve a response capacity (as is the case with much police work), control over the cost of providing that response.

The final choice relates to the collection strategy. Currently all activity measurement approaches used by police agencies initially record data on paper. The advantage of paper based measurement is that it involves relatively low fixed costs. Once large amounts of data are collected, paper based instruments become costly to administer.

Automated data collection processes can also reduce turnaround time. However, electronic processes require substantial fixed costs, and are most effective where there is a large volume of data generated and processed on a regular basis. If the purpose of activity measurement is for annual external reporting requirements, such as output based budgeting, then a manual instrument is likely to suffice.

While a purported benefit of moving to an electronic system is improved turnaround time, there is merit in considering contracting out the distribution and processing of questionnaires as a means of reducing turnaround time. The decision involves an agency weighing the costs of contracting out against the costs of processing the results in-house (accounting for the opportunity cost of the time spent by internal staff processing the survey). Queensland Police, for example, process results via a private external contractor and often wait only a week for the results to be returned to them. In contrast, SA Police processed results in-house, and noted:

In our main surveys, the minimum is 4–6 weeks for collating and scanning the data and an additional 4–6 weeks for completing the range of reports we produce ... (Humphries, J., SA Police, Melbourne, pers. comm., 27 July 1999)

Agencies may also use activity measurement to generate data for national performance reporting. Police agencies have been hindered in meeting this objective by the fact that they use significantly different ways of aggregating activities and outputs into output groups.

Australian police agencies undertook a mapping project to improve the concordance of output groups. It revealed that the differences in approaches may have been better accommodated by coordinating approaches nationally when each jurisdiction was developing its system. A coordinated exercise might involve developing a standard set of national outputs for agencies (or developing a standard approach to activity measurement whereby agencies could aggregate their data to report against a set of standard outputs).

In summary, these experiences of police agencies suggest general guidelines for designing an activity measurement system in other areas of government (box 2.5).

Box 2.5 Guidelines for designing an activity measurement system

Identify the objectives/purpose of activity measurement

Consider the purpose of introducing activity measurement. The objectives may be to:

- meet an external obligation to cost agency outputs and/or facilitate performance measurement; or
- meet internal management needs.

Identify the information requirements

Given the objectives of the process, determine the type of information that is required to satisfy those objectives. If information is to facilitate performance measurement across jurisdictions, then a coordinated effort should be undertaken to establish a standard set of outputs (or to develop a standard approach to activity measurement whereby agencies could aggregate their data to report against a set of standard outputs). Are data to be collected before (*ex-ante*) and/or after (*ex-post*) the activity has been undertaken? Further, what are the tradeoffs between the level of detail and the cost? How frequently, and how quickly, are data required?

Consider existing systems that provide information on agency resources

Decide whether existing internal systems that generate resource and/or costing information are comprehensive and timely enough to meet information requirements.

Establish an approach to activity measurement

If existing information systems do not provide the information required, choose an approach to activity measurement that meets agency objectives/information needs.

- If the primary objective is to use activity measurement for costing outputs, then select an approach that generates broad information on the delivery of outputs.
- If the primary objective is to use activity measurement as a sophisticated internal management tool, then select an approach that generates more information on specific tasks and activities.

Design an activity measurement system

Once the agency adopts an approach, design an activity measurement system (for example, an activity survey, timesheets or some other measurement tool). Consider design aspects: sample design; timing/frequency; and a data collection strategy.

Determine the processing/analysis system

The final decision involves determining an approach to data processing and analysis. Consider whether to conduct data processing in-house (either via an internally or externally designed database system) or contract it out. Also consider the possible need to coordinate the processing of data from existing information systems.



3 Implementation issues

The capacity of activity measurement systems to provide accurate data largely depends on how they are implemented. Agencies face challenges in successfully implementing an activity measurement system. This chapter reflects the practical observations of police agencies on implementing activity measurement. It cites lessons that police agencies learned in implementing their specific systems, and outlines some general guidelines for implementing activity measurement in other government agencies.

3.1 Implementation objectives and strategies

An agency faces a number of objectives when implementing an activity measurement system. These objectives are consistent with those central to the design and development of an activity measurement system (box 3.1).

Box 3.1 Some implementation objectives

Some key objectives of agencies when implementing activity measurement include:

- encouraging high response rates;
- encouraging accurate responses;
- collecting high quality data at minimum cost;
- facilitating more effective use of activity information;
- developing a cost effective data improvement strategy; and
- minimising the full cost of data collection and collation.

For the implementation phase, police agencies found that it was important to develop and employ strategies explicitly designed to achieve these objectives. Police agencies found that internal support by all staff (from junior to senior ranks) for the process was essential to maintain data accuracy, high response rates and ensure that the results were used effectively. In particular, the role of senior management was particularly important. Without the support of immediate

supervisors and officers-in-charge, line staff were unlikely to view the process as personally worthwhile. WA Police, for example, noted:

The positive attitudes displayed by district officers and officers-in-charge towards the activity survey were reflected in the acceptance and commitment to the survey by line staff working under these officers ... (Blair, R., WA Police, Melbourne, pers. comm., 27 April 1999)

A key lesson in the successful implementation of an activity measurement system is that staff must have sufficient incentive to cooperate. Factors that police agencies found to influence staff incentives included:

- ensuring the confidentiality of activity information;
- minimising the burden that an activity measurement exercise imposes on staff; and
- promoting and sharing the benefits of the activity measurement exercise.

Benefits of confidentiality

To strengthen incentives for accurate responses, it is particularly important to allay apprehension among line staff that the activity measurement system will be used to audit individual performance. Most police agencies emphasised that the purpose of activity measurement was external reporting on the organisation, and not reporting on individuals. Victoria Police noted:

We have emphasised that the survey is not designed to assess the performance of officers, but simply to track where resources are being directed. This has been supported by the type of reports produced and circulated as feedback ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

Similarly, when they conducted activity surveys, NSW Police commented:

It was stressed to officers that the survey was not an assessment of personal or patrol performance, focusing rather on service outcomes delivered to the community ... (Baldwin, J., NSW Police, Sydney, pers. comm., 15 April 1999)

Accounting for and minimising the burden on staff

Police agencies have needed to overcome staff opinion that the survey instrument is just an additional burden imposed on them by management. Successfully accounting for the respondent burden of the instrument in the design stages can encourage staff at all levels to participate in the process.

All police agencies sought to design their systems to minimise respondent burden. Less complicated activity measurement systems tend to reduce the burden on staff, because they require less staff time to complete the associated activity forms. They can also encourage the more accurate recording of information. Tasmania Police commented:

We will continue to try and make the survey form as simple as possible by improving the overall structure and presentation of the survey form. This should reduce the burden on staff ... (Robinson, M., Tasmania Police, Melbourne, pers. comm., 3 May 1999)

New methods for collecting activity information could also reduce staff burden. Possible alternatives include the use of laptop computers in patrol cars, electronic patrol logs and hand-held mobile data terminals. Although these tools are unlikely to be used by all staff, they are expected to encourage staff participation and ensure more accurate recording of information. However, these tools are likely to be adopted for reasons other than activity measurement (for example, computer aided dispatch). Their use for activity information is likely to be a by-product of other objectives.

Promoting and sharing the benefits of activity measurement

Police agencies recognised the need to put greater effort into communicating to staff the importance of cooperating, and into ensuring that all staff share the benefits of the exercise.

Promoting activity measurement required agencies to spend more time communicating with staff. WA Police commented:

We have used a number of people to travel to districts to market the process as a means of improving the knowledge that line staff and management have of the activity measurement process ... (Blair, R., WA Police, Melbourne, pers. comm., 27 April 1999)

Victoria Police noted that promotional strategies were instrumental in encouraging participation in their activity measurement process:

The [activity measurement] exercise is not treated lightly — Victoria Police emphasise the linkages with broad reform to highlight to staff the importance of completing the activity survey. There is an improved awareness of the significance of the survey, resulting in a response rate of 98.7 per cent ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

Another lesson was that staff needed information on the purposes of collecting activity information. Activity measurement can generate a range of data in line with

internal and external objectives, and agencies should clearly explain this information use to staff. Victoria Police commented:

For employees to participate fully and provide accurate information, an understanding of the purpose of the activity surveys has been paramount ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

Promoting activity measurement includes sharing the results and any other benefits from the measurement, where required, among participants. Some police agencies told their staff that fuller responses to the form provide an opportunity for the organisation to better argue for improved funding arrangements. SA Police focused on this issue during their presentations to potential activity survey participants.

Providing appropriate support mechanisms for staff

Teething problems may arise as an agency introduces activity measurement, particularly when it is entirely new rather than based on an existing system. The provision of training, information and a central contact point for support and advice can be instrumental in:

- promoting participation in an activity measurement exercise; and
- helping staff to record accurately the time spent delivering specific outputs and activities.

Training

Depending on the nature of the instrument used, training may be necessary to help staff complete survey forms or timesheets. Many police agencies trained their officers in a number of areas. Tasmania Police, for example, trained specific coordinators for each district to assist them with responding to any problems encountered by staff. Victoria's District Training Officers received information on the activity survey, while District Planning Officers and Computer Coordinators also received advice and information before the survey week.

Information sharing

Some jurisdictions chose not to provide training, but most have employed strategies to help survey respondents complete the relevant forms. Queensland Police distributed a detailed information booklet to survey respondents in the early stages of their activity survey process. The information booklet provided examples of how to complete a survey form correctly. Queensland Police and some other agencies

(including Tasmania Police) have since included similar practical examples within their survey forms.

Victoria Police established a network of contact and liaison points to provide advice and support to those participating in the survey. These contacts also act as a conduit between survey participants and the central coordinator, ensuring that local concerns and conditions are raised and addressed.

Quality assurance

Reviewing the quality of information obtained via an activity measurement system, and the processes for collecting this information, is an important strategy for:

- strengthening the incentives for accurate and relevant staff responses;
- ensuring the agency is using the most appropriate processes to collect information; and
- demonstrating the integrity of the data for funding and internal decision making.

Police agencies have sought to undertake ‘consistency checks’ of the data received from staff. In many jurisdictions, officers in charge or immediate supervisors check whether staff are participating in the process and completing the relevant forms in an appropriate manner. SA Police commented:

We have some systems in place. For example, manual checks by survey staff and informally by supervisors ... (Humphries, J., SA Police, Melbourne, pers. comm., 27 July 1999)

Some jurisdictions have also introduced formal mechanisms to ensure consistency in responses. These can be built in to database packages. Victoria Police noted:

Mechanisms are programmed into disks to enable recorded responses to be checked (for example, who has/has not filled in the survey) and to ensure errors, such as double counting, do not occur. This has also allowed other specific aspects of the survey to be verified ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

SA Police used a similar strategy:

In data processing, the package we use to read the survey data has a verification procedure. Upon importing the information to the database, particular discrepancies can be picked up by a specially designed program ... (Humphries, J., SA Police, Melbourne, pers. comm., 27 July 1999)

Agencies can often deal with other quality control issues (including consideration of data reliability and validity) by cross-checking activity information with similar

information gathered by other sources and evaluating the accuracy of the data gathered.

Agencies may also consider individual approaches to ensure data validity, such as personal observation and asking staff to indicate their level of certainty in having selected the most appropriate categories on survey forms.

Checking mechanisms and general quality assurance procedures should be enhanced as agencies move from paper survey forms to automated, electronic data collections. SA Police noted:

Systems will be built into the programming of our electronic devices which will check that the survey has been completed appropriately and provide direct help on completing the survey correctly ... (Humphries, J., SA Police, Melbourne, pers. comm., 27 July 1999)

3.2 Timing of implementation by police

The timing of the implementation of activity measurement systems for police agencies has varied. Nationally, implementation was phased, beginning with the introduction of activity measurement by Queensland Police and NSW Police in 1993. Activity measurement systems have since been introduced by police agencies in all remaining Australian States and Territories except the NT, which will introduce a systems based approach in late 1999 (table 3.1).

Table 3.1 Introduction of activity measurement systems by Australasian police agencies^{a, b}

1991	1992	1993	1994	1995	1996	1997	1998
NZ		Queensland NSW				Tasmania WA SA Victoria	ACT

^a Activity surveys have been introduced in Queensland, Victoria, SA, WA and Tasmania, while alternative activity measurement systems have been set up in NSW and NZ. The ACT undertook a one-off activity survey in 1998, and expects to introduce a regular activity survey process soon. ^b The NT is yet to trial an activity measurement system but expects to introduce a systems based approach in late 1999 (although it will not involve the use of activity surveys).

The development of activity measurement has facilitated the phased implementation of similar systems in other jurisdictions. Tasmania Police noted:

The design of the Tasmanian Police activity survey was largely based on the instrument used by Queensland Police, and modified to suit Tasmania's outputs. This was because Queensland Police were the only Australian police agency to have introduced an activity survey when Tasmania moved to output based budgeting ... (Robinson, M., Tasmania Police, Melbourne, pers. comm., 3 May 1999)

Queensland Police trialled their survey to obtain feedback and make necessary refinements:

A few amendments were made to the survey and it was retrialled. The surveys (including officer feedback forms) were sent out again to a few stations. The survey was refined once more and was then distributed statewide ... (Hortz, O., Queensland Police, Brisbane, pers. comm., 5 March 1999)

Victoria Police took a similar approach:

An output costing project team originally considered three survey format options and subsequently trialled two survey formats. The purpose of the trials was to: select the most effective survey format; use relevant and appropriate language in the surveys (particularly for specialist areas); and account for all activities undertaken by operational and support personnel.

Trials were held in a number of metropolitan areas, and feedback was obtained either in an interview situation or by telephone. From the feedback received, the survey format was selected and enhanced, and a list of activity definitions was created to assist police when allocating shift hours to tasks performed ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

3.3 Conclusion

The manner in which activity measurement is implemented plays a major part in its success. This chapter has discussed the issues that agencies, if they are to achieve that success, must address when implementing an activity measurement system. The implementation strategies used vary, depending on the type of system employed and the relative needs of each agency.

Key implementation challenges include generating support by senior management and line staff for activity measurement, and minimising the adjustment problems for staff. Senior level support is important for the legitimacy, credibility and general operation of an activity measurement system, while the support of line staff for the activity measurement process largely determines the quality of responses. Consequently, it is important for agencies to promote general support for the process by:

- improving the incentives for staff to cooperate with the process. This involves:
 - ensuring the results of the information exercise are made available to the key participants at all levels. This may require publishing different results to cater for particular needs. Where possible, staff need to feel they benefit from the exercise, given they incur a cost on their time,
 - minimising respondent burden;

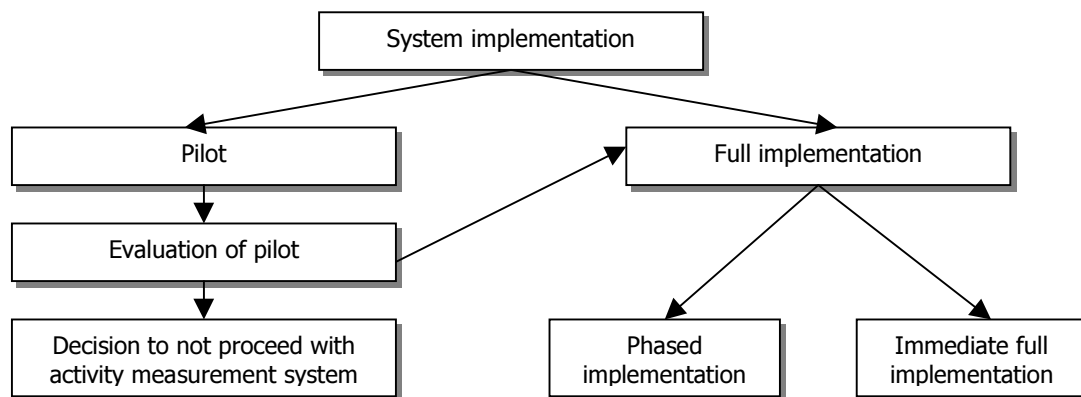
- marketing the concept to senior executives and managers to encourage use of results;
- notifying key stakeholders of the purposes and processes involved with activity measurement;
- providing the necessary support structures and/or training for staff; and
- recognising that the process represents an ongoing commitment in which a number of factors, including the objectives of the exercise, may change. This may require establishing a process of regularly reviewing the instrument, scope and collection of activity information.

These experiences of police agencies illustrate options for the implementation of an activity measurement system for other areas of government. The first key decision is whether to conduct a pilot exercise or to opt for full implementation (box 3.2).

Box 3.2 Guidelines for implementing an activity measurement system

Timing the implementation of an activity measurement system

Implementation options range from pilot exercises to test the effect of the instrument, to staged implementation of an instrument, to full implementation in the shortest possible timeframe, as outlined below.



Designing implementation strategies

When the activity measurement system is implemented, an agency should consider effective marketing and training strategies for generating internal staff support for the system.

Sources: SCRCSSP (1998) and State and Territory police agencies (unpublished 1999).

The benefit of a pilot is that it allows the option of discontinuing or refining the activity measurement process relatively easily, and of identifying the adjustment costs early. Police agencies in Victoria, Queensland and Tasmania conducted pilot surveys.

After conducting the pilot, an agency can decide whether to proceed with implementing the system. If it decides to continue, the next key decision is whether to phase in or immediately implement the system. Phased implementation allows time to illustrate the potential benefits of activity measurement; it eases the adjustment burden; it allows scope to refine the system; and it allows enthusiasts to volunteer, thereby generating a flexible approach and support for the system. In contrast, immediate full implementation allows the agency to realise the potential gains sooner, and it reduces the uncertainty for participants. Some police agencies chose immediate full implementation and others phased in their systems, initially surveying only a small sample of staff before expanding the process to other areas of the organisation.

Finally, the agency must choose the most appropriate strategies (especially for training and marketing) to assist with the effective implementation of their activity measurement system.



4 Costs and benefits

The design and implementation choices for activity measurement are influenced by the cost of establishing and maintaining the system. This chapter identifies some of the costs incurred by police agencies in developing, implementing and running activity measurement systems. These costs are weighed against the benefits of activity measurement, informing assessments of the cost effectiveness of different choices.

4.1 Benefits of activity measurement

Given that activity measurement for police agencies has generally been underway for only a few years, the associated benefits (which are often non-financial) may not appear in the form of improved outputs or outcomes, at least in the short term. Many benefits may also be linked to reforms in related areas, such as output based budgeting. These benefits can accrue to a variety of parties both internal and external to the service provider.

Benefits to government and the community

The major benefit of activity measurement is the ability to generate information on resource allocation, output delivery and service delivery costs. Most police agencies have introduced activity measurement to cost their outputs. Such information has provided input into the budgetary process in some jurisdictions, including Victoria (box 4.1).

Box 4.1 Victoria Police output information in the budgetary process

The Victorian Department of Treasury and Finance used the results of Victoria Police's activity survey to publish revised budget information on output costs for police services in its 1999-2000 Budget Papers. The results of the Victoria Police activity survey generated a significant revision to the distribution of costs across the six operational policing outputs (table).

Budget for Victoria Police (\$m)

<i>Output group</i>	<i>1998-99 Budget</i>	<i>1998-99 Revised^a</i>	<i>Change^b (%)</i>	<i>1999-2000 Budget</i>
Crime prevention and community support	250.2	368.8	47.4	394.4
Incident and event management	145.2	87.5	-39.7	91.4
Crime investigations	270.5	224.8	-16.9	231.4
Road safety and road trauma reduction	203.1	93.0	-54.2	87.1
Supporting the judicial process	71.1	223.2	213.9	233.2
Information and licensing services	65.6	33.4	-49.1	34.2
Total	1 005.7	1 030.7	2.5	1 071.7

^a Revised budget distribution reflects significant changes based on activity survey results. ^b Change from 1998-99 Budget to 1998-99 Revised.

Source: Victorian Department of Treasury and Finance (1999).

The revised budget also provided Victoria Police with a more comprehensive base against which to demonstrate output costs across the entire budget. The previous apportionment of output costs was based on historical data distribution, and was revised following consistent results from three activity surveys undertaken by Victoria Police.

The following factors underpinned the reallocation of costs across output groups for a similar total budget allocation.

- Activity surveys were conducted during typical periods, thereby better reflecting the costs of *crime prevention and community support programs* (higher than previous estimates) and *incident and event management* (lower than previous estimates).
- The recognition of some Traffic Operations functions as community safety outputs increased the reported costs of *crime prevention and community support programs* and reduced the reported costs of *road safety and traffic management*.
- Revising an earlier overestimate of the demand in firearms recall project increased reported costs for *crime prevention and community support programs* while reducing reported costs for *information and licensing services*.
- The separate identification of court brief preparation significantly increased the reported costs of *supporting the judicial process* while simultaneously reducing reported costs for both *crime investigations* and *road safety and trauma reduction*.

Source: Victoria Police (unpublished 1999).

Recurrent expenditure on police services is significant in all States and Territories throughout Australia. Nationally, police services accounted for nearly 70 per cent of total justice related recurrent expenditure in 1997-98 (table 4.1). Substantial changes to the delivery and apportionment of funding for police outputs (such as those outlined for Victoria Police in box 4.1) are likely to have significant flow-on effects for the delivery of justice services. More appropriate delivery and distribution of funding for police outputs are likely to improve the monitoring of outcomes for police and the justice sector overall.

Table 4.1 Total recurrent expenditure on police services, 1997-98^a

	<i>Unit</i>	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas^b</i>	<i>ACT</i>	<i>NT</i>	<i>Aust</i>
Amount	\$m	1 229	936	547	396	278	95	57	83	3 621
Share of total justice sector expenditure ^c	%	66	78	65	64	65	77	70	60	69

^a Includes recurrent expenditure (less revenue from own sources). ^b Expenditure is likely to be inflated by approximately \$4 million due to inclusion of expenditure for unique functions such as protection of poppy industry, marine activities and State Emergency Services. ^c Total justice sector expenditure includes recurrent expenditure on police services, court administration and corrective services. Recurrent expenditure on court administration is in 1997-98 dollars; excludes in-house revenues (which include revenue earned by in-house providers of library court reporting and civil bailiff services providing services to external purchasers); includes expenditure on probate registries; excludes expenditure on coronial cases; and includes the Family Court of WA. Recurrent expenditure on corrective services includes expenditure by umbrella departments on behalf of corrective services, and it is net of recurrent receipts or own source revenues.

Source: SCRCSSP (1999).

Benefits to senior management and staff

A significant benefit of an activity measurement system for senior management is the ability to better determine how resources are being allocated. Tasmania Police commented:

We have adopted activity surveys as a means of obtaining clearer knowledge of how much of our total resources is being used for different activities and whether our energies are being directed to priority areas ... (Robinson, M., Tasmania Police, Melbourne, pers. comm., 3 May 1999)

The activity measurement systems of most police agencies provide a breakdown of information by department, region, district, station or unit. The agency, by analysing activity information, can review the current output mix for these areas and determine if changes are necessary to achieve desired results. The activity measurement process facilitates comparisons between these areas and has the potential to feed into lower level planning processes.

WA Police noted:

Activity survey results are distributed to Regional and District Management for resource allocation and planning purposes. Results are distributed by way of an information package which includes State, region, district and station results. Also provided in these packages (at the regional level) is a comparison between the latest activity survey results and the planned output mix for the year ... (Blair, R., WA Police, Melbourne, pers. comm., 27 April 1999)

For output based management to succeed, accountability for outputs should be linked to individual output. This is partly achieved via activity measurement: staff can see how their work affects the overall outputs and outcomes of the organisation.

Victoria Police commented:

Staff get a better 'macro' sense of their work by being required to classify their day-to-day activities. This gives a clearer perception of how their work contributes to the broader corporate goals of Victoria Police ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

Comparing approaches

Continuous time measurement systems (those that monitor time for every day of the year) generate a range of benefits that a snapshot survey approach may not capture. NZ Police commented that their continuous time measurement system generates more precise data than that of an activity survey. They noted:

We believe that our system has many advantages over a survey approach, including greater precision, particularly given the fact that police work can vary substantially over a year. An example is unusual events, such as school holidays, that can have a major effect on the activities undertaken by police, and this may not be picked up by a survey. Further, policy changes in other areas of government and business can often have a major impact on police work, and this is able to be identified through our continuous time measurement system, whereas it is likely to be missed through a snapshot survey approach ... (van der Heyden, J., NZ Police, Melbourne, pers. comm., 26 April 1999)

In contrast, WA Police have conducted an activity survey during both typical and atypical weeks (as a means of observing the effect of unusual events, such as school holidays, on the activities undertaken by police). They concluded that the overall workload for police increased during an atypical week, although the mix of outputs being delivered did not change significantly. Thus, WA Police felt that moving to a continuous monitoring system (which would capture data for both typical and atypical weeks) would arguably provide them with minimal additional information on how police officers were spending their time.

4.2 Use of activity information

Many jurisdictions use activity measurement results to inform internal management decisions and external policy processes, although there appears to be scope for additional analysis as senior management becomes more familiar with the strengths and weaknesses of this information. All jurisdictions have used activity measurement results in the costing of their outputs (box 4.2).

Most police agencies have implemented a process of formal feedback to encourage greater internal analysis of activity measurement results. Victoria Police commented:

We are currently seeking to assist senior management to undertake more analysis of results. Asking senior management for feedback regarding the relevance of the results to them often does this ... (Thurgood, P., Victoria Police, Melbourne, pers. comm., 31 March 1999)

Tasmania Police noted implementing a similar approach:

A formal feedback process will be established whereby following the next activity survey, Superintendents will be asked to provide feedback as part of a review of strategies and performance ... (Robinson, M., Tasmania Police, Melbourne, pers. comm., 3 May 1999)

Box 4.2 Using police activity information

NSW Police

Activity information is used for budget purposes. For internal senior management, information is reported at the service level and available at the activity level. For local (cost centre) use, information is to be generated at service and activity levels and available at the roster duty level.

The information is also used to demonstrate the shift in resource use (either policy directed or event dictated). The use of resources on disaster recovery, for example, will show up as an increase over the normal monthly use. The source of the extra resources will also be evident (for example, overtime or a commensurate reduction in other services). Policy or directed priority shifts are also trackable. A shift to targeted patrols as a crime prevention initiative, for example, will be reflected in an increase on that duty together with a reduction in the shifts worked on other activity such as response patrol.

Activity information is also used to demonstrate the NSW Police commitment to 'frontline policing'. Over and above the shift in the total number of police at operational units, there is also a need to show the use of resources for essentially 'police' activity and increasing field activity (that is, out-of-station activity).

Finally, information is used to link the use of inputs (and thus the cost of outputs) to outcomes such as reduced crime, increased visibility and public satisfaction.

Victoria Police

Activity information assists with performance monitoring for operational departments. Data indicate business activities that could be re-designed to support efficient and effective service delivery.

At the corporate level, activity information is used for output management reporting to Treasury and for several Victoria Police business plan performance measures.

WA Police

Information from previous activity surveys was used to obtain a picture of the extent to which the level of effort for particular outputs needed to vary to address priorities and needs. The results of this process were used to set corporate priorities and targets for budget statements and the annual business plan.

At a corporate level, activity information is distributed to regional and district management for planning the deployment of resources to meet local issues, and to monitor their progress throughout the year. State, region, district and station results are distributed in an information package. Regional level packages compare the latest activity survey results and the planned output mix for the year.

Some areas within the organisation use the information as a day-to-day management tool to evaluate (and in some cases refocus) the way they conduct their business. Operational support areas are refocussing their effort in various activities to provide the best possible support to districts.

(Continued next page)

Box 4.2 (Continued)

SA Police

Activity information is often used in conjunction with other data such as the ABS Population Survey Monitor. This information is intended for the top level of the organisation, but also filters down to help line staff determine where resources should be directed. SA Police ensure all results, where possible, are provided to Local Service Area Commanders to help determine resource deployment and policing objectives.

Tasmania Police

The two main clients of Tasmania Police's activity survey results are internal support areas — the finance and human resources departments. The data provided are a useful tool for validating other source data, and are used extensively.

Queensland Police

Senior management use activity information to identify how staff spend their time. They can then match the information with identified community needs to provide appropriate types and levels of service delivery.

Survey data are also an integral component of the budgetary process, providing information for costing outputs. Finally, the data provide evidence of areas in which agencies may achieve greater efficiencies.

Sources: State and Territory police agencies (unpublished 1999).

Making better use of activity data — integrating information

While activity data are being used for internal and reporting purposes, agencies have signalled they plan to use activity data more for management decisions in the future. One strategy is to link the results of activity measurement with other available information. Police agencies, for example, may be able to forge stronger links between inputs, outputs and outcomes by integrating their activity information with recorded crime statistics, community perceptions data and regional/district roster information. Some agencies, including Victoria Police, already use this strategy.

Another example is a new project being developed by SA Police, which intends to identify determinants in key policing outcomes by examining activity data and data sourced from other measurement systems. The aim of the project is to develop a model for documenting the direct and indirect links between community perceptions (and level of satisfaction) and crime reduction (as measured by reported crime statistics).

4.3 Costs of activity measurement

Activity measurement involves financial and opportunity (non-financial) costs, including:

- set-up costs (the costs incurred through establishing the system, including any associated programming, development and implementation costs). These costs may be incurred over a number of years as an agency undertakes refinements, modifications and further developments;
- consultancy/staffing costs (the costs incurred in creating survey forms or timesheets, and the costs of processing the results and generating police activity reports); and
- staff opportunity costs (the burden on staff of filling in survey forms or timesheets when they would otherwise be undertaking alternative duties).

These costs are likely to vary across jurisdictions for a number of reasons — for example, the level of detail, the measurement scope and coverage, the frequency, the collection method, and whether data processing is conducted in-house or contracted out.

Jurisdictions that have more detailed or complex instruments, survey more staff, or survey more frequently tend to generate higher costs. These costs are reflected in terms of both system management and the overall burden on staff. Each police agency uses a manual collection process, so costs tend to involve relatively fewer up-front or fixed costs, and higher respondent burden and manual data processing costs.

An agency that contracts out part of its activity measurement process may or may not incur lower costs. Queensland Police tendered out their activity survey to a private operator to reduce the turnaround time of their survey and generate cost savings. However, police agencies in some smaller jurisdictions chose to use internal processes.

Direct financial costs

The development, implementation and running of activity measurement incur direct financial costs (for example, overheads and outsourcing costs). Police agencies were able to provide estimates of their costs.

Direct financial costs were defined to include the costs of:

- designing and printing surveys and timesheets;

-
- providing trainers and training materials;
 - distributing information packages to staff;
 - marketing the process;
 - designing and/or implementing an electronic database package for recording activity information; and
 - collating and processing results, and generating reports based on the data.

Caution should be exercised when analysing the cost comparisons because the estimates are not based on agreed data definitions and counting rules. For those police agencies that conduct activity surveys, the total annual cost ranges from \$8 per staff member in WA to \$27 per staff member in SA. For NZ Police, which use a continuous time measurement system, the total annual cost is \$273 per staff member (table 4.2).

Although the costs of activity measurement vary according to the approach adopted, most approaches are inexpensive when compared with total staffing costs. Table 4.2 indicates that for Australian police agencies using activity surveys, the costs of activity measurement were no more than 0.05 per cent of total staffing costs, while for NZ Police, activity measurement costs were approximately 0.5 per cent of staff costs (table 4.2). These costs need to be weighed against the benefits from the amount and type of information collected via activity measurement, and the impact this information can have on the distribution of an agency's costs and internal decision making.

Table 4.2 **Indicative estimates of the annual costs of developing and administering an activity measurement system**

	<i>Unit</i>	<i>NSW^a</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT^b</i>	<i>NT^b</i>	<i>NZ^c</i>
<i>Total financial costs</i>	\$	..	37 900	32 300	14 800	68 700 ^d	6 300	..	..	560 700
– Set-up	\$	..	8 900	7 800	4 400	8 100	900	..	..	160 500
– Preparation	\$	..	15 000	10 300	5 600	5 700	1 800	..	..	116 500
– Processing	\$	..	14 000	14 200	4 800	300	3 600	..	..	283 800
<i>Total opportunity costs^e</i>	\$	..	228 300	51 900	34 200	44 500	16 400	..	..	1 810 900
– Police staff opportunity costs	\$	..	215 300	46 300	33 000	44 400	15 500	..	..	1 498 700
– Non-police staff opportunity costs	\$	..	13 000	5 600	1 200	100	900	..	..	312 200
Total annual costs	\$	..	266 200	84 200	49 000	113 200	22 700	..	..	2 371 600
<i>Total number of staff by operational status^f</i>	FTE	17 421	11 824	9 478	6 114 ^g	4 147	1 440	728 ^h	1 078	8 692
– Operational FTE staff	FTE	14 875	8 970	na	4 252	2 842	1 048	584	795 ⁱ	5 226
– Non-operational FTE staff	FTE	2 546	2 854	na	1 862	1 305	392	144	283	3 466
<i>Total financial unit costs</i>	\$/staff	..	3.2	3.4	2.4	16.6 ^d	4.4	..	..	64.5
<i>Total opportunity unit costs:</i>	\$/staff	..	19.3	5.5	5.6	10.7	11.4	..	..	208.3
Total annual unit costs	\$/staff	..	22.5	8.9	8.0	27.3	15.8	..	..	272.8
Activity measurement costs as a proportion of staff costs^j	%	..	0.04	0.02	0.02	0.05	0.03	..	..	0.54

^a The NSW Police roster system has involved zero modification costs and zero opportunity cost. ^b The ACT and the NT are yet to introduce regular activity measurement processes. ^c Converted into Australian dollars based on the A\$/NZ\$ period average market exchange rate for April 1999 (International Monetary Fund 1999). ^d Included approximately \$54 600 in staffing costs that could not be disaggregated. ^e Calculated as the total full time equivalent staff surveyed in a given year, multiplied by average police staff costs per year. ^f The equivalent number of full time staff required to provide the same hours of work as performed by staff actually employed. Measured as the average of the snapshot full time equivalent (FTE) at the beginning and end of the financial year. ^g Based on functional area rather than the individual, where an area may be deemed to be operational but have some non-operational staff. ^h Included a notional 129 staff for corporate support functions attributed to ACT community policing provided by the Australian Federal Police. ⁱ Excluded staff unavailable due to training and development activities. Included Police Auxiliaries and Recruits. ^j Calculated as total activity measurement costs divided by total salaries and payments in the nature of salary, as sourced from SCRCSSP (1999). .. Not applicable. na Not available.

Sources: State and Territory police agencies (unpublished 1999) and NZ Police (unpublished 1999).

Opportunity costs

The staff opportunity cost is the value of the time (if any) staff spend filling in survey forms or timesheets over and above the time they spend (or would have spent) on their daily patrol logs or rosters. Thus, the NSW Police approach involves a zero opportunity cost because roster forms do not impose an additional cost on staff.

Estimates of staff opportunity cost quantify the respondent burden generated by an activity measurement system. Consequently, systems that are more detailed and complex tend to produce a higher staff opportunity cost, requiring more staff time in completing the associated activity forms.

For those police agencies that conduct activity surveys, estimated opportunity costs per staff member were highest for Victoria Police (\$19) and lowest for Queensland Police and WA Police (\$6). For NZ Police, the estimated opportunity cost per staff member was \$208 (table 4.2).

4.4 Limits to activity measurement

Output budgeting — an important external reporting requirement for many agencies — is intended to improve strategic decision making and resource allocation by making agencies more accountable to government for the results they achieve. Similarly, an agency's units (business units or cost centres) can be held accountable by senior management for the outputs they achieve.

However, in attempting to improve the accountability of a service such as police, it is difficult to adequately specify the outputs for which police have direct control and responsibility. A large part of police work involves responding to crimes or events that they do not directly control. The activities and outputs defined and monitored through activity measurement describe such responsive behaviour. This may be viewed as a shortcoming of activity measurement, but it reflects the broader issue of output specification.

SA Police, for example, emphasise the fact that their organisation is not based around output groups. Earlier attempts to introduce program based funding failed to deliver improved efficiencies because the organisation failed to change its internal structure from an area structure to a program structure. SA Police believe that similar issues apply to current reforms. For activity measurement to prove a useful tool in improving accountability, then accountability to outputs must be passed

down the line to officers or units of officers. As such, activity measurement systems in isolation are always an ‘agent of change’ without other necessary reforms.

Use of activity measurement to cost outputs

Activity measurement can provide useful information for costing an organisation’s outputs. However, caution must be exercised when allocating indirect costs (for example, corporate overheads) to agency outputs for some decision making purposes. In particular, fully costing the outputs of an agency may not be appropriate for the purposes of competitive tendering and contracting out — an issue explored further here.

Under activity costing, corporate overheads are typically identified (by a *pro rata* rule or direct measurement) and apportioned to each of the outputs. Thus, the cost of an output comprises the direct labour costs and other variable costs of that output, plus a proportion of those indirect costs that are necessary for the functioning of the organisation as a whole.

But this approach may overstate the actual costs of providing more or less of a specific output or service. Some corporate overheads may not vary with changes in the levels of outputs: for example, executive costs may be attributed to a unit (such as the Criminal Investigation Department or the Traffic Operations Group within a police agency), whereas they remain largely unchanged whether that particular output is increased or scaled back.

The allocation of costs is also an important issue for agencies when implementing competitive neutrality policies. The appropriate method for calculating the cost of an output for competitive neutrality purposes is the marginal cost. Marginal cost is the cost of producing an additional unit of a good or service. It generally includes direct costs that vary with output, and some indirect costs (CCNCO 1998). Conceptually, the *short run marginal cost* best indicates the cost of production of an additional unit of output at any point in time. It typically excludes most capital costs because these will be fixed in the short run. Similarly, the *long run marginal cost* is the cost of supplying an additional unit of a good or service when capacity can be varied. It includes operating costs and the capital costs of increasing productive capacity. In contrast to fully distributed costs, it excludes indirect costs that are fixed in the longer run, such as some corporate overheads and their associated capital stocks (CCNCO 1998).

Most appropriate method of cost allocation

In practice, marginal costs can be difficult to measure (CCNCO 1998). Two proxies for marginal cost are the *incremental cost* and the *avoidable cost*. Incremental cost is the increase in a business's total cost that is attributable to the production of a particular type of good or service. Similarly, avoidable cost includes all the costs that would be avoided if the agency no longer provided an output. In practice, there is generally little difference between avoidable cost and incremental cost, because the cost saved by not producing the output is usually the same as the additional cost of making the product available.

Under the avoidable cost method, the cost base of the business unit will consist of all costs that the agency would save if the business unit ceased operation. Avoidable cost comprises:

- the additional cost to the parent agency of the business unit using its resources (assets and overheads); and
- the costs of resources used exclusively by the business unit (including capital costs).

Government has used activity measurement widely because it offers a simple way to distribute joint costs and overheads. However, this method of cost allocation does not measure the amount by which costs would be reduced if the output were correspondingly reduced. An avoidable cost approach to costing outputs measures only the costs that would be avoided if the agency no longer provided an output. However, the avoidable cost method can require significant judgment, and the differences between avoidable cost and activity measurement will not be great in some situations (generally where business units are significant users of parent agency assets). Where the difference is likely to be small, the simplicity of activity measurement may make it an acceptable proxy. Further, because activity measurement generates relatively disaggregated cost data, it could be adjusted to provide estimates on an avoidable or marginal cost base.

4.5 Conclusion

An activity measurement system has a range of financial and non-financial costs, including set-up costs, consultancy/staffing costs and staff opportunity costs. Differences in costs can be partly attributed to the volume of information collected by agencies, and the resulting implication for the response burden on staff and the costs of processing. The unit costs of the NZ Police approach are relatively high, but this needs to be balanced by the benefits of the additional data collected (see Appendix C).

It is more difficult to quantify the benefits arising from activity measurement. These have led to changes in funding arrangements for Victoria Police, and a number of police agencies are using the results for both external reporting requirements and internal management. The benefits flowing from each respective system vary significantly, and these should be considered against the relative information requirements of each jurisdiction.

To achieve a net benefit, table 4.2 indicates the additional information from the Australian systems would have to generate an improvement in resource allocation equal to less than 0.05 per cent of staff costs, or 0.5 per cent for the NZ Police system. The costs of activity measurement are inexpensive relative to an agency's total staffing costs, regardless of the approach adopted.

5 Lessons and future directions

Activity measurement provides management and government with information to better understand the relationships between inputs and outputs. Police agencies in Australasia have used a number of activity measurement instruments to meet external and internal reporting requirements. Their experiences provide valuable lessons for other agencies considering a similar exercise.

5.1 Lessons from Australasian police agencies

Despite activity measurement being a relatively new concept in Australian government service delivery, the experiences of Australasian police agencies generate some broad lessons.

Police agencies throughout Australia and NZ have widely adopted activity measurement to facilitate their move to accrual output based budgeting. Activity measurement is also increasingly used as an internal management tool.

Designing an activity measurement system

An agency's information requirements will largely determine the design of the measurement instrument. A key step in the design of an activity instrument is the specification of outputs and activities. The choice of outputs and activities that are specified will depend on whether the measurement is intended for external reporting objectives or internal resourcing requirements.

The differences in detail between activity survey instruments across jurisdictions should not mask the broad similarities between them. Each jurisdiction faced choices when designing its instruments. These included tradeoffs between:

- the cost of activity measurement, and the detail of information and the precision of estimates;
- the collection of detailed data on activities and tasks, and the measurement of staff time spent on activities and tasks. (The method by which some agencies

measure time reduces the scope for collecting more detailed information on the activity and associated task); and

- the cost of measurement and the precision of the estimates. (A snapshot approach involves lower costs but will generate less precise information if the pattern of activity varies across different periods).

Police agencies in all jurisdictions except NSW, the ACT and the NT collect information on outputs that are actually delivered rather than planned. This approach is most appropriate where the primary objective is to cost outputs for the purpose of external reporting. However, for the purpose of internal reporting, the data do not distinguish between rostered activities and those unplanned events or incidents that require staff to respond.

Each jurisdiction faced the choice between a paper based approach and an automated electronic system. Most jurisdictions adopted paper based instruments that had low set-up costs. These proved to be low cost entry into activity measurement, but are likely to present significant limitations if expanded for internal management needs. Such limitations include the prospect of increased respondent burden and poor timeliness of data. Automated electronic systems, such as those employed in Cleveland in the UK, may address these limitations.

Agencies may also use activity measurement to generate data for national performance reporting. Police agencies have been hindered in meeting this aim by the fact that they use significantly different ways of aggregating activities and outputs into output groups. A more coordinated introduction of activity measurement, including developing a standard set of national outputs for agencies, or developing a standard approach to activity measurement (whereby agencies could aggregate their data to report against a set of standard outputs) would reduce the costs and challenges of adjusting systems later.

Implementing an activity measurement system

The manner in which an activity measurement system is implemented plays a major part in its success. Implementation strategies are most effective when they account for the incentives for staff to participate in the activity measurement exercise. Key strategies include:

- sharing the benefits/results of the exercise, and reducing the respondent burden;
- maintaining the confidentiality of the results;
- marketing and promoting the exercise to staff; and
- providing a support network to staff participating in the survey.

The specific strategies used in each jurisdiction varied, depending on the type of system employed and the relative needs of each agency.

Costs and benefits of activity measurement

The costs of implementing activity surveys in Victoria, Queensland, WA, SA and Tasmania are broadly similar, reflecting the similarity of their measurement approaches. The cost of the data collection instrument is considerably higher in NZ. The costs of the NSW Police system are relatively low. These differences are largely a consequence of the volume of information generated. The NZ Police approach generates considerably more detailed data than any Australian model. The NSW Police approach to data collection typically records one activity per staff member per shift, and it does not collect information on unrostered activities.

Activity measurement was first introduced in Australia in 1993, spreading more widely since 1997. There is evidence that the measurement results are proving useful for budget negotiations with governments and for internal purposes. Activity surveys had a major impact on the budget allocation for Victoria Police in 1998-99, when the distribution of output costs was significantly revised. Jurisdictions are also beginning to find opportunities to use activity data as part of their management information systems, including linking the data to crime statistics and community perceptions (satisfaction) data.

Challenges for users of activity measurement

There are limits to directly measuring activities for the purpose of costing an agency's outputs. Measuring activities does not necessarily imply that agencies and their units can be held accountable for outputs over which they do not have complete control. For example, many police agencies report some outputs that comprise activities over which the agency can only influence rather than control. Further, most agencies use activity surveys to collect information on actual activities during the sample period. Survey information could be useful for improving planning if it distinguished between rostered activities and those activities where staff were required to respond.

Both these issues reflect the way in which activity surveys and timesheets specify activities. They should not be regarded as a shortcoming of activity measurement.

A second challenge is ensuring that activity costing is not used to overstate output costs for some decision making purposes (such as competitive tendering) by applying activity data inappropriately to apportion corporate overheads. For

competitive neutrality purposes, some activities need to be costed at their short or long term avoidable costs.

A third challenge is discouraging agencies from focusing on inputs too closely rather than outputs. This raises the complex issue of defining and specifying outputs and inputs, and linking outputs and outcomes: for example, activity measurement provides information on the quantity of a service, not the quality. The ‘activity trap’ is a tendency for agencies to focus on the amount of effort expended rather than on the results achieved. NZ Police noted:

One real problem is that ‘you are what you measure’ and some managers have fallen into the trap of relying on activity monitoring as a tool to set and assess performance simply on the ‘quota’ of hours assigned to individuals or groups, rather than the overall quality of service ... (van der Heyden, J., NZ Police, Melbourne, pers. comm., 26 April 1999)

This focus on inputs is not a shortcoming of activity measurement, because the purpose of the exercise is to measure inputs as a means of costing outputs, not to measure the effectiveness of service delivery. Rather, it is a shortcoming in the focus (which is on inputs instead of outputs and outcomes) and the use of activity information. Activity measurement is a tool for measuring resource allocation, so could easily be used as a vehicle to improve the delivery of outputs.

5.2 Future directions

Other government services are recognising the benefits of activity measurement for monitoring the deployment of resources to core agency functions. Activity measurement can provide useful information wherever a resource, typically a staff member, apportions their time directly to different outputs. This tool may be useful for services such as:

- emergency services (for example, metropolitan fire and ambulance services, country fire authorities and state and territory emergency services);
- health (where staff may treat different types of patients);
- corrective services (where officers are involved in containment and rehabilitation activities);
- agricultural and environmental services; and
- community services (where staff are involved, for example, in both child protection and family support outputs).

The Queensland Fire and Rescue Authority, for example, used an activity survey to quantify the time staff spend on the diverse activities that characterise the authority's service (box 5.1).

Box 5.1 Activity measurement for the Queensland Fire and Rescue Authority

In 1998, the Queensland Fire and Rescue Authority (QFRA) became the first emergency management agency in Australia to introduce an activity measurement system. It introduced an activity survey to document the various workplace activities and tasks that occur throughout the work period. The activity survey was based on the Queensland Police survey.

All permanent staff performing duty on behalf of the QFRA were required to complete a daily activity survey form during a one week period. The survey listed a range of 'activities' (for example, fire investigation, volunteer management, chemical incidents) and associated 'tasks' (for example, response, general duties, inquiry and investigation). Staff recorded the amount of time spent on each activity according to the associated task.

The primary purpose of the activity survey was to support the Queensland Government's move to output based budgeting. The activity survey provided the QFRA with the information necessary to cost its outputs.

The activity survey also provided access to performance and costing information to allow continual comparisons of the QFRA's progress against its stated goals, and to enable the QFRA to bid for increased resources.

Like most police agencies, the QFRA viewed the activity survey as an interim approach to generating information on inputs and outputs. It is in the process of moving towards an integrated electronic based system.

Source: Queensland Fire and Rescue Authority (unpublished 1999).

Other areas of government have also expressed an interest in adopting activity measurement systems. A number of WA Government agencies (including the Department of Family and Children's Services and the WA Ministry of Justice), for example, have shown interest in the activity survey process used by WA Police. Like police, these agencies have individual staff members or facilities that provide multiple outputs.



Appendix A

Police activity measurement systems

This appendix outlines the key features of activity measurement systems for police agencies throughout Australia and NZ.

Table A.1 **Police activity measurement systems, by jurisdiction**

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>	<i>NZ</i>
<i>Method</i>	Roster/ finance system link	Activity survey	Activity survey	Activity survey	Activity survey	Activity survey	Activity survey (proposed)	na	Timesheets
<i>Frequency</i>	Continuous	Twice yearly (under review)	Twice yearly	Twice yearly	Twice yearly (proposed; currently quarterly)	Once yearly	Twice yearly	na	Continuous
<i>Scope</i>	All staff	All operational staff (sworn and non-sworn)	All staff	All operational staff (sworn and non-sworn)	All operational staff (sworn and non-sworn)	All operational staff (sworn and non-sworn)	All staff	na	All staff
<i>Coverage</i>	All areas	<ul style="list-style-type: none"> • District work centres • Specialist crime squads • Specialist traffic areas 	<ul style="list-style-type: none"> • Regions • State Crime Operations Command 	<ul style="list-style-type: none"> • Stations • Specialist district units • Crime support • Traffic and operations support 	All operations staff (up to and including senior sergeant) and public servants who have contact with the public	<ul style="list-style-type: none"> • District based staff • Public servants who provide a direct service to the public • Operations support 	All staff	na	All areas

(Continued next page)

Table A.1 (Continued)

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>	<i>NZ</i>
<i>Sample design</i>	Census	Census	Census	Stratified sample of 100 stations and 140 specialist units in the 15 districts. This equates to approximately 41 per cent of the total workforce, or 58 per cent of operational staff.	Currently 15–20 per cent of operational staff sampled each quarter. Divisions are sampled on rotational basis.	Census	Census	na	Census
<i>Collection strategy</i>	Direct coding of cost centres for centralised administrative functions; unloading of full roster system, including duty type and duty code	All selected staff complete a survey form on daily activities for a seven day period. Activities are recorded in 30 minute blocks.	Staff complete a form each day for a seven day period. The form collects the total time directed towards a range of policing activities by staff.	All staff at selected stations complete a personal diary for a seven day period, noting effort against activities in 20 minute blocks. Effort is estimated against activities for units within crime support and traffic and operations support.	Staff complete a form over 14 days for each shift, noting effort against activities in 15 minute increments.	Staff complete a form over seven days, recording activities on a half hour basis.	One week (exclusive of school holidays, special events, etc.)	na	Staff complete a record for each half hour of duty. Staff code the 'task' they undertook, along with the 'activity' associated with the task.

(Continued next page)

Table A.1 (Continued)

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>	<i>NZ</i>
<i>Estimation process</i>	..	Costs for all surveyed work centres are apportioned across outputs on the basis of survey totals.	..	Costs are apportioned on the basis of the activity survey for sampled stations in that district.	Costs are apportioned for some operational support staff, instead of surveying them.	Corporate services are apportioned across outputs on the basis of survey results.	..	na	..

na Not available. .. Not applicable.

Appendix B

Police activity measurement forms

This appendix presents a sample page from the activity survey and timesheet forms used by police agencies throughout Australia and NZ for the purposes of activity measurement.

The forms are included in the following order:

- Victoria Police;
- Queensland Police;
- WA Police;
- SA Police;
- Tasmania Police; and
- NZ Police.



Appendix C

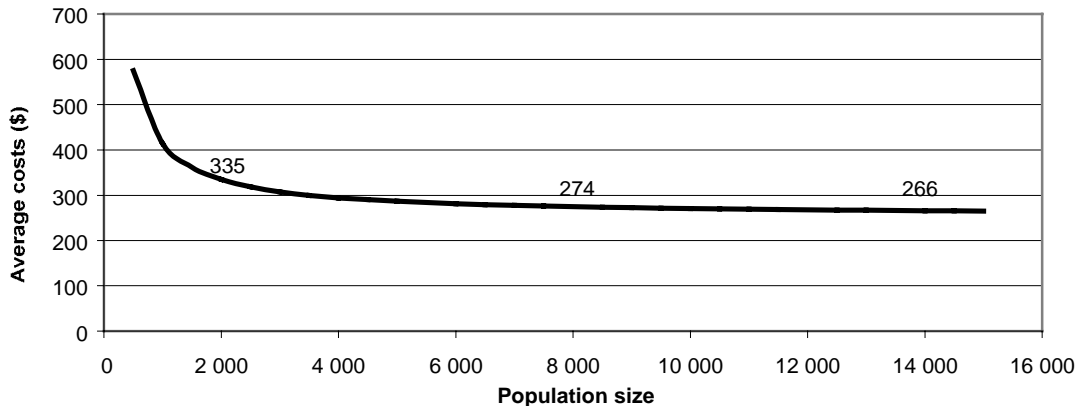
Analysing average costs

Average cost curves are derived for police agencies based on the fixed costs (initial set-up costs) and variable costs (preparation, processing and opportunity costs) incurred through activity measurement. Variable costs are those costs that are likely to change if the activity measurement exercise is expanded (or contracted) to include more (or less) staff

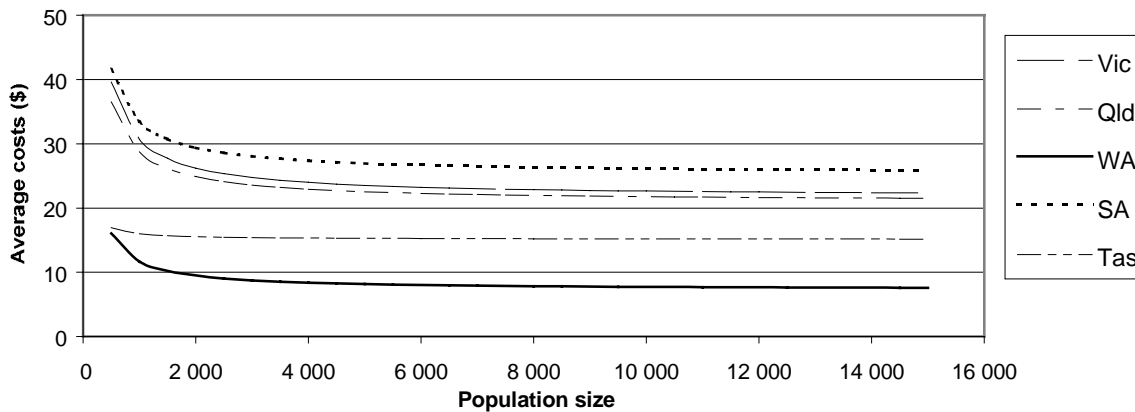
Figure C.1(a) shows the average cost curve for NZ Police. Figure C.1(b) shows the average cost curves for Australian police agencies using activity surveys.

Figure C.1 Average cost curves of activity measurement^{a, b}

(a) NZ Police



(b) Australian police agencies



^a Average costs are based on State and Territory estimates of the financial costs and opportunity costs of activity measurement. Costs are unadjusted. ^b Population size is the total number of staff in the jurisdiction's agency employing the instrument.

Sources: State and Territory police agencies (unpublished 1999).

The average cost curves show the cost of administering a jurisdiction's activity measurement system for a range of different police agencies (measured in terms of the population size). For example, if the NZ Police system was used to provide activity information for a police force of 2000 persons, the cost would be \$335 per police staff member.

The average cost curve for NZ Police is considerably higher than those of Australian police agencies (figure C.1(a)). This is largely because the NZ Police timesheet approach monitors the activities of all staff for every day of the year. This approach requires both higher set-up costs (the costs of establishing a database to accommodate the large volume of data collected), and higher variable costs (the costs of preparing and processing timesheets, and the associated burden on staff).

In contrast, average cost curves for Australian Police agencies that use activity surveys are very similar (figure C.1(b)). Average cost curves are steeper, for small population sizes, for those jurisdictions that incurred relatively higher fixed costs. The average cost curves can also differ between jurisdictions because agencies have different reporting requirements. For example, NZ Police collect considerably more data than do the other Australasian jurisdictions.

The key lessons to be drawn from this analysis are that:

- scale economies initially characterise activity measurement, but these dissipate as population size becomes large; and
- differences in average costs between jurisdictions can be largely attributed to;
 - the volume of information collected (a greater volume of data generates higher average fixed and variable costs), and
 - the frequency of the measurement exercise (a greater frequency corresponds with higher average costs, especially in terms of respondent burden).



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