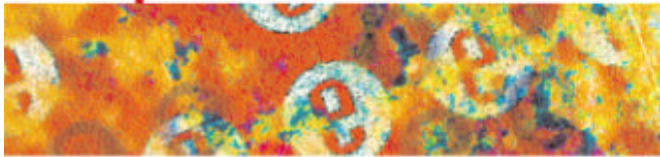




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DIRKS – A Strategic Approach
to Managing Business Information

STEP F – DESIGN OF A RECORDKEEPING SYSTEM

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F.1 WHAT IS SYSTEM DESIGN?

The design process involves producing a viable plan, or 'blueprint', that satisfies previously articulated requirements in an acceptable manner. In the context of DIRKS, the design step involves converting the strategies and tactics selected in Step E into a blueprint for a recordkeeping system that addresses:

- the recordkeeping requirements identified and documented during Step C; and
- any recordkeeping inadequacies or gaps identified during Step D.

A good system also needs appropriate supporting infrastructure, such as people and processes as well as tools and technology. Therefore this step is likely to involve:

- designing changes to current systems, processes and practices;
- adapting or integrating technological solutions; and
- determining how best to incorporate these changes to improve recordkeeping across your organisation.

System development projects often incorporate two important design practices:

- taking an iterative approach; and
- involving users in the process.

This means that, throughout the design phase, you check elements of the design against the recordkeeping requirements, ask users for feedback on elements that affect them, and make progressive, documented changes to the design until requirements are satisfied and users are happy.

The nature of this step will vary greatly depending on the strategies selected in Step E. For example, you may have decided to:

- revise existing policies and procedures relating to recordkeeping in the organisation;
- improve the recordkeeping functionality of existing systems in your organisation in conjunction with increased training and communication of recordkeeping responsibilities;
- develop and implement a new records system for high-risk areas of the organisation; or
- develop and implement a new records system for the entire organisation.

For this step, consider the overall strategy developed in Step E and determine which of the following activities will help bring it to fruition:

- [establish and maintain](#) recordkeeping policies (Section E.4.1);

- [assign](#) recordkeeping roles and responsibilities (Section E.4.2);
- [\(re\)design](#) work processes (Section E.4.3);
- [produce](#) design documentation (Section E.4.4);
- [design](#) electronic or hybrid systems for record creation, capture and control (Section E.4.5);
- [develop](#) recordkeeping guidelines and operating procedures (E.4.6);
- [conduct](#) regular design reviews (E.4.7);
- [develop](#) initial training plans (E.4.8); and/or
- [prepare](#) a system implementation plan (E.4.9).

You may wish to approach this step as a single project, or use the tools in this step to support a number of projects to improve recordkeeping in your organisation.

F.2 WHY IS THIS STEP NECESSARY? ISN'T THE WHOLE DIRKS PROCESS ABOUT DESIGN?

It is sometimes difficult in practice to see where determining recordkeeping strategies ends (Step E) and designing systems to incorporate those strategies begins (Step F). This is particularly the case when taking an iterative approach to system development.

In Step E you selected the mix of strategies that would best meet your organisation's recordkeeping requirements. In this step you make choices about *how* the individual strategies selected in Step E should be put together to create the most effective solution. This step involves recordkeeping professionals and other experts working with users to produce specifications that best meet:

- requirements (ie the identified need to create, capture, maintain and dispose of records);
- organisational constraints (ie cultural, technical, economic and sociopolitical factors); and
- user requirements (ie does not hinder day-to-day work, and is understandable and useable).

The net result will be a blueprint for organisational recordkeeping that will form the basis for implementation (Step G) and be acceptable to employees.

The extent to which you can involve users and take an iterative approach during the design phase will depend on time and cost constraints. Nevertheless, as with other aspects of records systems design, adopting such practices will help ensure that:

- recordkeeping requirements are feasible and consistent;
- recordkeeping requirements are satisfied;

- changes to requirements and the design are adequately documented;
- users develop a sense of system ownership through involvement during its development; and
- users understand the system and use it as it is intended to be used.

Outputs of the step will depend on the strategies and tactics chosen in Step E. Outputs may include:

- design project plans, showing tasks, responsibilities and time lines;
- reports detailing the outcomes of periodic design reviews;
- documentation of changes to requirements, signed off by both user and project team representatives;
- design descriptions, in narrative form, which can be easily understood by system users and other stakeholders;
- diagrams representing system architectures and components;
- detailed specifications to build or acquire technological components such as software and hardware;
- plans showing how the design will integrate with existing systems and processes;
- new policies, plans and procedures,
- initial training and testing plans; and
- an initial implementation plan.

F.3 RESOURCES AND PREREQUISITES

In order to prepare a blueprint for recordkeeping you will need:

- personnel with recordkeeping expertise;
- personnel with IT expertise;
- personnel with modelling and analytical skills relevant to your business activities;
- representative experts from relevant business areas (eg functional managers or operational staff);
- representative users; and
- personnel with an understanding of corporate governance (eg legal, audit and data security specialists).

As with other stages in the DIRKS process, members of your project team may be drawn from both within and outside the organisation depending on the nature of the project and available expertise.

Before starting Step F it is essential that you:

- complete Steps A to E;
- decide on a [model for overall systems design](#) (Step E); and
- develop and get approval for a business case for the design of a new system (Appendix 9 – [Guide to developing a business case](#)).

It is very difficult to design a successful recordkeeping system if you do not know and understand your organisation's recordkeeping requirements and organisational constraints. At the very least, you will waste a lot of time backtracking and re-doing tasks before you accomplish a successful implementation. The work you do during this step must address as closely as possible the specific requirements, deficiencies and strategies documented during Steps C, D and E. You will also need the recordkeeping tools – such as thesauruses and disposal authorities – derived from Steps A and B. It is therefore strongly recommended that you do *not* start at this step unless you have access to the information, knowledge and products arising from the earlier stages.

F.4 DESIGNING A RECORDKEEPING SYSTEM

The design or redesign of a system that needs to keep records incorporates a number of major activities, which must be conducted within agreed system development and change management frameworks. These activities can be mixed and matched depending on the situation within your organisation. This means that not all of these activities need to be conducted in the order shown – in many cases, activities can be conducted concurrently. In some circumstances, not all activities will be applicable. Choose the activities that are needed to develop the strategies selected in Step E.

F.4.1 Establish and maintain recordkeeping policies

As foreshadowed in Step E, it is important to establish and maintain a corporate recordkeeping policy framework. Your organisation may already have a policy framework in place. If so, old recordkeeping policies should be reviewed and updated as necessary. If not, new policies should be developed. The aim is to provide up-to-date corporate guidance on the various aspects of recordkeeping that have been identified in previous steps. For example, you may establish policies on one or more of the following:

- recordkeeping at the desktop;
- email as a corporate record;
- records and accountability; and
- disposal of records.

Many recordkeeping policies already exist at a whole-of-government level, such as those developed and released by the National Archives of Australia and by the State Records Authority of NSW. You may decide to adopt these,

unchanged, within your organisation. Alternatively, you may use them as starting points for developing your organisation's own tailored recordkeeping policies.

Your organisation may also be expected to operate under policies that have been promulgated by another organisation within the same portfolio or sector. Subject to your organisation's recordkeeping requirements, you may need to take into account the existence of such policies to help ensure a consistent approach within your portfolio or sector.

F.4.2 Assign recordkeeping roles and responsibilities

In previous steps you will have determined what recordkeeping tasks need to be performed in your organisation. Some of this functionality might lend itself to automation in an electronic system – but not all. The purpose of this activity is to determine who is responsible for specific recordkeeping tasks. This includes assigning responsibilities for quality control – someone must be responsible for ensuring that recordkeeping tasks are not only performed, but also performed correctly.

In some cases, you may assign responsibilities to a particular individual or staff position. In other cases, you may assign responsibilities to particular work groups or sections or to all staff across the organisation. Regardless of the persons, positions or sections assigned to particular responsibilities, you must ensure that all recordkeeping roles and responsibilities are clearly documented. This will help ensure accountability for recordkeeping actions (or inaction).

The activity of assigning roles and responsibilities should be conducted in conjunction with any [work flow or business process \(re\)design](#) (Section F.4.3) being undertaken. New or redesigned processes will result in the creation of new roles and responsibilities across the business area or organisation concerned.

This activity also provides input to the [development of training](#) (F.4.8). Tailored training will need to be developed for any person or area with a particular recordkeeping role or responsibility. For example, if action officers are expected to place emails and other electronic records on files in the organisation's new electronic records system, training will need to be provided to assist them in:

- determining what is or is not a record in the electronic environment;
- creating and naming files in the electronic records system; and
- capturing electronic records (that may be created using a variety of authoring applications) into the records system.

This will be especially important if action officers have never had responsibility for capturing records or creating files, or if your organisation is moving from a paper-based to an electronic recordkeeping system.

F.4.3 (Re)design work processes

Based on your analysis of organisational structures, business activities, processes and systems, and identification of recordkeeping requirements, it may be necessary to:

- design new processes and work flows that incorporate recordkeeping functionality; and/or
- redesign existing processes and work flows to incorporate recordkeeping functionality.

This can include both manual work processes and processes that use automated work flow software. Changing work flows and processes to address recordkeeping inadequacies may also be a catalyst for other changes to the way things are done in the organisation. It may become clear that changes should be made to business processes to eliminate existing problems, such as:

- information bottlenecks and duplication;
- information double-handling; and
- inability to quickly locate and retrieve important information (including records).

The design or redesign of business processes to incorporate recordkeeping tasks may, in fact, be just one facet of a major business process re-engineering (BPR) exercise.

Changes to business processes will result in the creation of new, or the modification of old, business rules. More importantly, for staff, it will result in new ways of working. Changes to business processes must have clear management backing, and be supported by:

- the assignment and documentation of [new roles and responsibilities](#);
- timely modification or development of [guidelines and operating procedures](#); and
- [training](#) in new responsibilities, processes and procedures.

There is significant potential for this activity to cause major disruption to staff (and, hence, to the organisation's business). Any redesign of work flows and business processes should be handled sensitively and within a [change management framework](#).

F.4.4 Produce design documentation

In most design projects documentation is an ongoing and prolific activity. System design documentation is developed progressively at different stages (or 'milestones') in the design process. Each design solution generated by the project team or tendered by an external party should incorporate extensive design documentation, including:

- design diaries, detailing original design decisions and rationale, and documenting changes made to the design over time;
- introductory, non-technical design descriptions addressing senior management, staff and other stakeholders;
- descriptions of redesigned or newly designed business processes;
- logical and physical models of different aspects of the system;
- metadata specifications;
- structured, precise hardware and software design specification(s), addressing computer system developers and vendors;
- initial testing plans;
- initial training plans; and
- a skeletal system implementation plan.

F.4.5 Design electronic or hybrid systems for records creation, capture and control

Depending on the strategies selected in Step E, it may be necessary to design significant electronic components for your records system, incorporate recordkeeping functionality into existing systems or to integrate some automation into existing paper-based systems. This part of the system design may be conducted by:

- the IT and business analysis staff on your project team;
- external consultants;
- system vendors; or
- a combination of the above.

Even if you have no interest or expertise in technical design you must nevertheless be prepared to provide a professional opinion on the recordkeeping functionality of the electronic system as it is being designed. Ask questions or speak out if it appears that the recordkeeping functionality of the system is being compromised. A formal [design review](#) is a good forum at which to bring up problems or concerns you might have regarding either recordkeeping functionality or system useability, irrespective of whether you are designing electronic, paper-based or hybrid systems.

It is not the purpose of this step to describe in detail the different modelling tools used in computer system design as there are many authoritative books and articles available on these matters. [1] The following outline simply provides a brief introduction to the process and focuses on:

- determining whether to buy or build;
- conducting logical systems design;
- conducting physical systems design; and

- developing a systems testing plan.

You will notice that some of the activities are similar to those carried out as part of the larger system design process.

F.4.5.1 Determine whether to buy, build or both

When you determined your overall design strategy in Steps A and E, you made some choices (at a broad level) regarding the best mix of ‘buy and build’. However, the choices you made then were concerned with the *entire* system design process, not just the technological components of the design. It is still necessary to determine whether:

- existing in-house technology can be utilised;
- additional technology should be bought and/or tailored; or
- additional technology should be designed and by whom.

The recordkeeping requirements that you articulated in Step C will indicate the complexity and scope of the technological components that your organisation needs. Cost, flexibility, and speed of integration and implementation are factors likely to influence key decisions about the technology you adapt, acquire or design as part of the records system. In addition, the decisions made here will influence the [physical design](#) (Section F.4.5.3) of the system.

F.4.5.2 Conduct logical system design

Logical design pertains to the ‘what and when’ of a system, that is, its functions and processes. It focuses on what the system should do, and how it should appear to the users. Logical design involves the use of various conventions and modelling tools to translate the requirements identified and documented in Steps C and E and the generic characteristics in Part 1, Section 4 – [Characteristics of systems that keep records](#) into detailed technical specifications for system inputs, outputs, interfaces and data stores.

Logical design includes the design of:

- forms and templates, such as metadata templates, which enable the presentation and collection of information;
- user interfaces, such as menus and dialogue boxes, which enable users to interact with a system; and
- data stores, such as databases, which enable data or information objects to be stored in a structured way.

During the logical design of an electronic system, users need to be actively involved in [reviewing the design](#) to verify that the system is useable and continues to meet requirements as it evolves.

F.4.5.3 Conduct physical system design

Physical design deals with the ‘how and where’ of a system. It involves specifying the technological characteristics of the system, including:

- overall system structure;
- system integration;
- software program structures,
- hardware configuration; and
- data (information) processing, storage, access and protection.

It is strongly recommended that organisations specify and adopt open systems architecture and non-proprietary information technology standards to manage electronic records required for long-term access. [2]

Note that system integration can include:

- integration with existing electronic systems or applications (for example, an organisation’s legacy system, current electronic document management system or suite of document authoring applications); and
- integration of specific recordkeeping tools (such as thesauruses, disposal authorities, or metadata creation tools) to enhance the recordkeeping functionality of the system.

A system integration plan should be compiled for use during the implementation phase (Step G). This plan is similar in concept and structure to the [system implementation plan](#), but it relates only to the technological components of the system.

Decisions made in earlier steps about whether to [buy, build or combine both approaches](#) will impact on the physical design of the system. In one sense, these decisions really constitute a part of the physical design. Inevitably, the choice of particular technologies will place constraints on the functional capabilities of the system being designed.

It is possible that, during physical design, problems or errors will occur which can be traced back to the [logical design stage](#). This may reflect inconsistencies in the requirements. Even at this late stage, you need to continue consulting with users, gathering additional information and, where necessary, making and documenting changes to the requirements and/or the system design.

As the final design activity before system implementation, physical design provides the last opportunity to ensure that the system design is consistent, complete, and meets your organisation’s requirements. Changes to design after this stage will prove both costly and time-consuming. It is therefore strongly recommended that system auditors and security specialists contribute to this activity.

F.4.5.4 Develop system testing plan

One final activity in the design of an electronic system is to develop an overall system testing plan. This plan is a sub-element of the testing processes referred to in Step G.

The system testing plan details the different kinds of testing that need to be carried out during implementation of the system, and specifies what form(s) the testing should take. Testing of electronic systems involves using test data and scenarios to verify that each component, and the system as a whole, works as intended under both normal and unusual circumstances. Some examples of what needs to be tested during the implementation of an electronic recordkeeping system, or during the incorporation of recordkeeping functionality into an existing system, include:

- system functionality (Does the system do what it is required to do?);
- system integration (How well do the different components work together?);
- user interfaces (Are menus, forms and templates understandable and useable?);
- validation of inputs and outputs (Does the system produce or allow the entry of erroneous data?); and
- system response and recovery times (How quickly does the system perform tasks; how long does it take to recover from crashes or interruptions?).

System operating procedures will also need to undergo testing to ensure correctness, useability and clarity.

F.4.6 Develop recordkeeping guidelines and operating procedures

In accordance with the strategies selected in Step E, during this step you will need to revise or draft guidelines and procedures for staff to follow when carrying out recordkeeping tasks. The guidelines and procedures should be based on business rules and processes for organisational recordkeeping, and constructed around defined recordkeeping roles and responsibilities. This means that recordkeeping guidelines and procedures should be developed in conjunction with [\(re\)designing work processes](#) and [assigning recordkeeping roles and responsibilities](#). Recordkeeping requirements are more likely to be met if they are incorporated into standard guidelines for particular tasks or business areas, rather than being a separate set of rules. If significant redesign of organisational processes is required to incorporate recordkeeping tasks and assign new roles and responsibilities, you will be unable to develop the procedures and guidelines until this other work is nearly completed. However, if little change is required in these areas, you can start work much earlier.

If existing guidelines and procedures are reasonably up-to-date, and changes to processes and responsibilities are not expected to be major, you may only need to review the current set and make small modifications to it.

You need to develop guidelines and procedures from scratch if:

- there were previously none in place;
- those in place are *significantly* out of date;
- changes to business rules, processes and responsibilities are extensive; or
- your organisation is moving from a wholly paper-based to an electronic recordkeeping system.

You should work with personnel involved in the design of electronic systems for recordkeeping to identify, as early as possible, which tasks will be manual and which automated. Responsibility for the development of operating procedures may be divided between different team members or parties on the basis of whether a particular task or process is manual or automated.

As with the other components that are designed for use by people, you need to gain user feedback on the layout and clarity of the guidelines and procedures as they are being developed.

F.4.7 Conduct regular design reviews

Iterative design and the involvement of users in the design process can prove highly effective in ensuring the development of a successful system. During Step F, in-house project team members and/or external consultants need feedback from system users about the system components that affect them. Design reviews, both formal and informal, provide a useful means of eliciting feedback.

The purpose of design reviews is to ‘walk’ users through the design of particular components or to demonstrate a functional aspect that has been incorporated into the system. Formal design reviews are generally held at critical stages in the design process, such as the completion of the design of a major system component. For example, a formal review may follow the (re)design of a complete set of work flows and processes for a particular work group. The designers will go through their design, explain what they have done and why they have chosen to do it that way, and show how the design meets requirements. Users and other stakeholders are then given the opportunity to ask questions, comment, criticise or suggest alternatives to the design.

Design reviews help to maintain links between requirements and design. They continue the process begun with the high-level requirements audit exercise conducted, during Step E, of mapping functional requirements to system design components. Design reviews should enable you to find flaws

and inconsistencies in the detailed design, and to become aware of requirements that have:

- not been properly addressed;
- changed; or
- become infeasible due to other changes or new constraints.

Design reviews often result in requests for changes to requirements and/or to parts of the design itself. For this reason, it is essential to document the outcomes of the review. It is also vital that you maintain a visible documentary trail from the requests for change to resulting changes in requirements or design. Requested changes which are not implemented, or which are implemented partially, must also be documented.

F.4.8 Develop initial training plan

Develop a high-level training strategy on good recordkeeping practice. Design the structure and initial content of training for organisational staff. Consider alternative delivery methods and determine which method(s) will work best in your organisation.

The content of recordkeeping training may include:

- recordkeeping definitions;
- why good recordkeeping is important;
- an overview of current organisational recordkeeping policy;
- expectations of the organisation, portfolio, jurisdiction and/or sector with regard to recordkeeping and accountability; and
- staff recordkeeping roles and responsibilities.

If an electronic records system is included as part of the overall design, you will need to consider the kinds of training and support staff will need to help them use the system to perform recordkeeping tasks. You should produce an initial plan which lays out a preferred formal training structure, including on-the-job support and desktop training aids. Training methods may include:

- face-to-face training, where participants also have ‘hands-on’ practice on a live system;
- online, context-sensitive help;
- reference cards;
- ‘tips and hints’ documentation, regularly updated in response to problems and quirks encountered by users;
- user guides and manuals, in hard-copy form and/or made available on your organisation’s intranet; and
- user help-desk facilities.

Special one-to-one or tailored training may also be required for managerial staff or select groups of users with [particular responsibilities](#).

Even at this early stage of training development, you should keep in mind principles of good user interface design. This will help ensure that both online and hard-copy training material is easy for users to read, understand and digest.

F.4.9 Prepare initial system implementation plan

The system implementation plan provides a view of the various system components (processes, procedures, people and technology), showing how they are intended to fit together. The plan also lays out a schedule of work for implementation and integration of the components, and identifies which parties will be responsible for different implementation activities, such as:

- site preparation;
- training and education;
- completion of procedural documentation;
- software programming;
- hardware configuration;
- system testing;
- pilot testing; and
- full system installation.

Work on the implementation plan can be carried out in parallel with other system design activities in this step, but it cannot be completed until all the components have been designed.

F.5 ISSUES

There are at least two possible issues that most organisations will face during this step:

- determining the limits of user participation in the design process; and
- determining where design stops and implementation begins.

F.5.1 Determining the limits of user participation in the design process

It may be difficult to decide at what stage you should forgo any further iterations of the 'design a bit – review and test – redesign as necessary' process. Such a decision is likely to be heavily influenced by time and budgetary constraints, as well as the need to satisfy your organisation's recordkeeping requirements as closely as possible.

F.5.2 Determining where design stops and implementation begins

In many ways this issue is related to the broader issue of user participation. Nonetheless, eventually you must make the decision to stop refining the design and begin the implementation process, whether you choose to design, review, test and implement small components of the system one at a time, or to complete the design of the total system prior to moving on to implementation.

As you will see in Step G – [Implementation of a recordkeeping system](#), it is possible (and desirable) to continue to involve users in the design process prior to full system implementation through such mechanisms as system pilots and phased system implementations.

F.6 CHECKLIST

Before proceeding further check that you have:

- involved staff and other stakeholders in the design process by asking for their feedback on relevant system components (such as policies, processes, roles and responsibilities, guidelines and procedures);
- documented any changes to requirements and design components arising from consultation;
- prepared detailed design descriptions, logical and physical models, and technical design specifications for electronic system components;
- prepared a system implementation plan;
- prepared an initial training plan; and
- obtained management endorsement of the design process.

F.7 WHAT'S NEXT?

Assuming you have obtained management endorsement of the design process, the recordkeeping system can now be implemented (Step G).

ENDNOTES

1. There are many authoritative books and articles on the various aspects of system design. The following is a small sample.
 - Britton, C and Doake, J, *Software System Development: A Gentle Introduction*, 2nd edition, McGraw-Hill, London, 1996.
 - Hoffer, J A, George, J F and Valacich, J S, *Modern Systems Analysis and Design*, Benjamin/Cummings Publishing Company, Reading, Massachusetts, 1996.
 - Kozar, K A, *Humanized Information Systems Analysis and Design: People Building Systems for People*, international edition, McGraw-Hill, New York, 1989.

- Modell, M E, *A Professional's Guide to Systems Analysis*, 2nd edition, McGraw-Hill, New York, 1996

Specific advice on designing recordkeeping systems and document management systems is provided in:

- Bearman, D, 'Managing Electronic Mail', *Archives and Manuscripts*, no. 22, vol. 1, May 1994, pp. 28-50.
 - Sutton, M J D, *Document Management for the Enterprise: Principles, Techniques and Applications*, John Wiley & Sons, New York, 1996.
2. For further information on technical standards see Charles M Dollar, *Authentic Electronic Records: Strategies for Long-term Access*, Cohasset Associates, Chicago, 1999.