

APPENDIX



Functional Requirements for Recordkeeping

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Functional Requirements for Recordkeeping Systems

The document in this appendix has been developed in conjunction with a three-year project at the University of Pittsburgh to study the first three questions of the research agenda outlined in *Research Issues In Electronic Records*. The agenda was developed at a working meeting sponsored by the National Historical Publications and Records Commission (NHPRC) on 24-25 January 1991. The University of Pittsburgh project, entitled "Variables in the Satisfaction of Archival Requirements for Electronic Records Management," is also funded by NHPRC. Its three goals are (1) to identify the archival functional requirements for electronic information systems serving widespread business applications and to evaluate alternative approaches to satisfying those requirements; (2) to identify attributes in organizations, business applications, and software applications which influence the success of achieving archival control over electronic records systems, in order to assist institutional archival electronic records programs to formulate successful approaches; and (3) to suggest criteria to evaluate and indicators to measure the effectiveness of archival policies, methods, and programs in modern organizations. Principal investigators for the project are Richard J. Cox and James Williams. David Bearman has served as a consultant to the project. This is a working document which will be revised annually. Presented below is the spring 1994 version.

Recordkeeping is a critical function which is performed through the collective action of individuals and systems throughout all organizations. Recordkeeping is not the province of archivists, records managers, or systems administrators alone, but an essential role of all employees and of individuals in their private lives.

Recordkeeping systems are information systems which are distinguished by the fact that the information they contain is linked to transactions which they document. Records may be consulted for documentation of those transactions or because they contain information that is useful for some completely separate purpose, but recordkeeping systems do not just contain data to be reused; they maintain evidence over time.

Recordkeeping systems support the corporate memory of organizations by supporting business functions of the organization. All business functions require records of business transactions in order to continue their day-to-day operations, satisfy administrative and legal requirements, and maintain accountability. The following functional requirements for recordkeeping systems define a corporate requirement for any recordkeeping system, not the application requirements of archives and records management systems. Archives and records management are only one business application within the organization, just as are manufacturing, sales, service delivery or personnel management.

In designing and implementing information and recordkeeping systems, the functional requirements for any particular business applications must be considered together with various corporate functional requirements. Archives and records management systems have functional requirements specific to their business application -- such as storage management, records retention and scheduling, reference management, and access control -- which are not discussed in this document. The functional requirements presented below, on the other hand, are universal for any recordkeeping system.

They may be of special interest to archivists, records managers, security officers, freedom of information and privacy administrators, auditors, lawyers, and others with special obligations towards records, but they should be of value and relevance to program managers at all levels from corporate management to line supervisors.

Although these functional requirements were specifically developed to provide guidance for the management of electronic recordkeeping systems, they are equally applicable to manual systems. Information systems professionals should note that business functions, business processes, business transactions, and business records rather than system functions, system processes, system transactions, or system records are the consistent focus of recordkeeping.

Articulating functional requirements is the first step in effecting adequate control of recordkeeping systems. The next step is to determine an organizational strategy for satisfying the functional requirement insofar as is appropriate. Strategies might include adopting policies and procedures, designing new systems, implementing systems in a way that supports satisfying the requirement, or developing standards. Each of these four strategies may be applied separately or in combination to each separate functional requirement. The choice of strategy will depend on the degree of risk involved in failure to satisfy a requirement within the business function which the recordkeeping systems is to support, the existing systems environment including hardware, software and architecture, and the corporate culture in which the strategy must succeed.

Functional Requirements for Recordkeeping

Compliant Organization

Accountable Recordkeeping System

Responsible
Implemented
Reliable

Captured Records

Comprehensive
Identifiable
Complete
Accurate
Understandable
Meaningful
Authentic

Maintained Records

Preserved
Inviolable
Coherent
Auditable
Removable

Usable Records

Exportable
Accessible
Available
Renderable
Evidential
Redactable

FUNCTIONAL REQUIREMENTS FOR RECORDKEEPING

Recordkeeping systems capture, maintain, and access evidence of transactions over time as required by the jurisdiction in which they are implemented and in accordance with common business practices.

Organization - Compliant

(1) Compliant: Organizations must comply with the legal and administrative requirements for recordkeeping within the jurisdictions in which they operate, and demonstrate awareness of best practices for the industry or business sector to which they belong and the business functions in which they are engaged.

(1a) External recordkeeping requirements are known.

(1a1) Laws of jurisdictions with authority over the record creating organizations are known.

(1a2) Regulatory issuances of entities with administrative authority over the record creating organizations are known.

(1a3) Best practices of recordkeeping established by professional and business organizations within the industry and business functions of the organization are known.

(1b) Records created by organizational business transactions which are governed by an external recordkeeping requirements are linked to an internal retention rule referencing the documented law, regulation, or statement of best practice.

(1c) Laws, regulations, and statements of best practice with requirements for recordkeeping are tracked so that changes to them are reflected in updated internal recordkeeping instructions.

Recordkeeping Systems - Accountable

(2) Responsible: Recordkeeping systems must have accurately documented policies, assigned responsibilities, and formal methodologies for their management.

(2a) System policies and procedures are written and changes to them are maintained and current.

(2b) A person or office is designated in writing as responsible for satisfying recordkeeping requirements in each system.

(2c) System management methods are defined for all routine tasks.

(2d) System management methods are defined for events in which the primary system fails.

(3) Implemented: Recordkeeping systems must be exclusively employed in the normal course of business.

(3a) Business transactions are conducted only through the documented recordkeeping system and its documented exception procedures.

(3b) No records can be created in the recordkeeping systems except through execution of a business transaction.

(3c) Recordkeeping systems and/or documented exception procedures can be demonstrated to have been operating at all times.

(4) Reliable: Recordkeeping systems must process information in a fashion that assures that the records they create are credible.

(4a) Identical data processes permitted by the system must produce identical outcomes regardless of the conditions under which they are executed.

(4b) Results of executing systems logic are demonstrable outside the system.

(4c) All operational failures to execute instructions are reported by the system.

(4d) In the event of system failures, processes under way are recovered and re-executed.

Records - Captured

(5) Comprehensive: Records must be created for all business transactions.

(5a) Communications in the conduct of business between two people, between a person and a store of information available to others, and between a source of information and a person, generate a record.

(5b) Data interchanged within and between computers under the control of software employed in the conduct of business creates a record when the consequence of the data processing function is to modify records subsequently employed by people in the conduct of business.

(6) Identifiable: Records must be bounded by linkage to a transaction which used all the data in the record and only that data.

(6a) There exists a discrete record, representing the sum of all communications associated with a business transaction.

(6b) All data in the record belongs to the same transaction.

(6c) Each record is uniquely identified.

(7) Complete: Records must contain the content, structure and context generated by the transaction they document.

(7a) **Accurate:** The content of records must be quality controlled at input to ensure that information in the system correctly reflects what was communicated in the transaction.

(7a1) Data capture practices and system functions ensure that source data is exactly replicated by system or corrected to reflect values established in system authority files.

(7b) **Understandable:** The relationship between elements of information content must be represented in a way that supports their intended meaning.

(7b1) Meaning conveyed by placement or appearance of data are retained or represented.

(7b2) System defined views or permissions are retained and the effects are reflected in the record are represented.

(7b3) Logical relations defined across physical records are retained or represented.

(7b4) Software functionality invoked by data values in the content of the record are supported or represented.

(7c) **Meaningful:** The contextual linkages of records must carry information necessary to correctly understand the transactions that created and used them.

(7c1) The business rules for transactions, which minimally locate the transaction within a business function, are maintained.

(7c2) A representation of the source and time of the transaction which generated a record is maintained.

(7c3) Links between records which comprised a business activity are retained.

(8) **Authentic:** An authorized records creator must have originated all records.

(8a) All records have creators which are documented.

(8b) Records creators must have been authorized to engage in the business transaction that generated the record.

(8c) A knowledge-base of persons authorized to engage in business transactions is maintained and either operates as a control over system functions such that transactions could not occur without being authorized and/or documents the authorization of the creator as part of the record.

Records - Maintained

(9) **Preserved:** Records must continue to reflect content, structure and context within any systems by which the record are retained over time.

(9a) **Inviolable:** Records are protected from accidental or intended damage or destruction and from any modification.

(9a1) No data within a record may be deleted, altered or lost once the transaction which generated it has occurred.

(9b) **Coherent:** The information content and structure of records must be retained in reconstructable relations.

(9b1) If records are migrated to new software environments, content, structure and context information must be linked to software functionality that preserves their executable connections or representations of their relations must enable humans to reconstruct the relations that pertained in the original software environment.

(9b2) Logical record boundaries must be preserved regardless of physical representations.

(9c) **Auditable:** Record context represents all processes in which records participated.

(9c1) All uses of records are transactions.

(9c2) Transactions which index, classify, schedule, file, view, copy, distribute, or move a record without altering

it are documented by audit trails attached to the original record.

(9c3) Transactions which execute a records disposition instruction whether for retention or destruction are documented by audit trails attached to the original record.

(10) **Removable:** Records content and structure supporting the meaning of content must be deletable.

(10a) Authority for deletion of record content and structure exists.

(10b) Deletion transactions are documented as audit trails.

(10c) Deletion transactions remove the content and structural information of records without removing audit trails reflecting context.

Records - Usable

(11) **Exportable:** It must be possible to transmit records to other systems without loss of information.

(11a) Exporting protocols should be reversible or the lost functionality should be represented in a fashion that produces the same result in the target system as in the originating environment.

(12) **Accessible:** It must be possible to output record content, structure and context.

(12a) **Available:** Records must be retrievable.

(12a1) The system must be able to retrieve the record of any transaction at any later date.

(12b) **Renderable:** Records must display, print or be abstractly represented as they originally appeared at the time of creation and initial receipt.

(12b1) The structure of data in a record must appear to subsequent users as it appeared to the recipient of the record in the original transaction or a human meaningful representation of that original rendering should accompany the presentation of the original content.

(12c) **Evidential:** Records must reflect the context of their creation and use.

(12c1) A human meaningful representation of the contextual audit trail of a record must accompany all displays or printed output.

(13) **Redactable:** Records must be masked when it is necessary to deliver censored copies and the version as released must be documented in a linked transaction.

(13a) The release of redacted versions of a record is a discrete business transaction.

(13b) The fact of the release of a redacted version of a record is an auditable use of the original record and therefore results in creation of an audit trail with a link to the transaction which released the redaction.