

Electronic Evidence

Strategies for Managing Records in Contemporary Organizations



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Preface

Over the past four years, almost half my professional activity has been directed towards solving problems associated with the management of electronic records in governmental organizations. I have been helped, influenced, and prodded by many colleagues and have benefitted in untold ways from that interaction. The number of my intellectual debts is too great for me to try to explain the circumstances of each, so I hope I will be forgiven for simply mentioning the large number of individuals who have played a role in shaping these ideas. In each case, these individuals contributed something without which the concepts developed here would have been much poorer.

I heartily thank Glenda Acland, Scott Armstrong, Rich Barry, Tora Bikson, Terry Cook, Richard Cox, Charles Dollar, Luciana Duranti, Liisa Fagerlund, Flavia Fonseca, Maria Magdalena Garcia, Sue Gavrel, Christoph Graf, Margaret Hedstrom, Mark Hopkins, Alan Kowolowitz, Clifford Lynch, Richard Lytle, John McDonald, Sue McKemmish, Maria Pia Rinaldi Mariani, Angelika Menne-Haritz, Harold Naugler, Dagmar Parer, Peter Sigmund, Steve Stuckey, Frank Upward, Lisa Weber, Ted Weir, and Ron Weissman for their ideas and the opportunities they provided me to explore mine.

In addition to an intellectual debt, I owe a logistical debt to these individuals because this volume would not have been compiled but for the fact that colleagues, on three continents, provided opportunities for me to publish in a variety of journals, thereby spreading these articles across a range of literature few archivists regularly read. Bringing these articles

together for the convenience of the reader presumed the inconvenience of their original placement, so the existence of this collection is very much a result of their generosity in inviting me to work with them, lecture in their countries, and conduct workshops under their auspices.

Finally, I owe a tremendous debt to Victoria Irons Walch who has brought the volume in this form into the world. She edited out my most egregious bad grammar and indexed the work to make it more accessible. In the process she identified numerous opportunities to clarify my meaning. Without her help, this would be very much less worthwhile. The errors remaining, of course, are my own and are guaranteed to be numerous, not the least because the leitmotif is change; this quest for methods to manage electronic records is not going to end in our lifetimes, which is why I think it fun to be in at the beginning trying out ideas, even if we may later think them foolhardy.

Pittsburgh, January 1994

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Introduction

Constructing a Methodology for Evidence

The articles in this volume were written between 1989 and 1993 and published in a wide variety of periodicals and reports.¹ They reflect the development of what I believe is a coherent approach to management of electronic records. However because this volume consists of chapters written while my thinking was evolving, ideas introduced in one chapter may be explored in more depth in another and early articles may have slightly different formulations of concepts that are developed more completely later.

I could have chosen to organize this collection of essays chronologically in order to better convey the evolution of these ideas, but I wanted to emphasize the approach to electronic records rather than my personal intellectual history. I have therefore taken the dual risk of writing a Whig autobiography of ideas and trying to convey a consistent methodology through a series of articles written as that methodology was forming. In arranging the chapters thematically I am hoping that the minor differences between the resulting papers will not interfere with the overall structure of the argument. To this short introduction, I leave the task of connecting the threads of ideas within the book, and between these articles and others which I wrote on this topic during the same years but have not reprinted here.²

The title of this collection itself reflects a significant shift in focus from extending traditional practices of archives and records management (of interest, quite reasonably, to archivists or records managers) towards definition of what should be a generic management concern (which is of critical importance to all managers anywhere in the organization). Two years ago, I would have titled it "Electronic Records Management" to remind archivists that records management was at the heart of any approach to electronic records. One year ago, I would have entitled it "Archiving Electronic Records" to use the term archiving in a way that archivists never would but which others do almost exclusively.

In the past year I have become increasingly convinced that the issue is how to ensure that information in computer systems is a record, which is to say that it is evidence of a transaction. I entitled this collection *Electronic Evidence* to emphasize the point that most collections of electronic data, electronic documents, or information are not records because they cannot qualify as evidence. I hope in this way to emphasize that the challenge to archivists, records managers, auditors, legal counsel, freedom of information and privacy personnel, and every program manager in an organization is to ensure that electronic data is captured in a way that makes it an electronic record and to address how this can be done. Over the course of several years, the challenge has become to focus on "recordness," something we were hardly even conscious of during the reign of paper, and to build a methodology for ensuring that this ephemeral attribute of collectivities of data is captured and kept.

THE PROBLEM

The revolution in computing and communications is transforming the way in which we conduct business in our society. This presents archivists with the challenge to explicitly define what requirements must be met by recordkeeping systems so that they can intervene in organizational policy, sys-

tems design, and program implementation to ensure the creation of records, preserve their integrity, and provide for access. The most complete articulation of the theoretical framework on which this volume elaborates is contained in Chapter One which explores the accountability crisis confronting many organizations that have adopted electronic information systems in the conduct of day-to-day work. This article was written in the summer of 1992 at the same time as the grant proposal for the University of Pittsburgh study of electronic records management which it describes in detail. The chapter is structured in the same way as this book and that research project: we begin by defining the functional requirements for recordkeeping, examine four tactics for satisfying those requirements, consider variables in the business functions, organizational structures, and technology environment, and then apply risk management principles to determining how much to satisfy the requirements.

The axiom that not all information systems are recordkeeping systems, which is developed in Chapter Two, actually emerged late in the formulation of these ideas, but has become the key to understanding concerns expressed earlier. Creation of records -- taken for granted by archivists in the age of paper documentation because communication in writing required the information content to be fixed on a medium in the form in which it was received -- can no longer be taken for granted. Because conscious intervention is required to shape information systems so that they will create records (rather than just data), organizations are faced with a crisis of accountability brought on by the use of electronic information systems. This article, written in the spring of 1993, references an early draft of the functional requirements for recordkeeping systems developed by the University of Pittsburgh research project on electronic records management, the latest version of which appears as the appendix in this volume.

THE POLICY APPROACH

My ideas about electronic records management were first elaborated in a consulting project for the United Nations Administrative Coordinating Committee on Information Systems Technical Panel on Electronic Records Management (ACCIS TP/REM) in 1988-89. The panel asked me to write the position paper on policy issues in the management of electronic records, a portion of which constitutes Chapter 3. When I had finished writing, I surprised myself by the degree to which policy could address electronic records management requirements that I would at first have considered susceptible only to technical solutions, and then I was intrigued to discover that there were also technical solutions even to the most patently policy- and procedure-related problems. Ultimately this led to the formulation of the hypothesis that there was only one set of functional requirements and that these could be satisfied through one of four tactics: policy, design, implementation, or standards. This idea that different approaches could be employed to satisfy the same underlying requirements has since been adopted as my basic strategy for management of electronic records and is illustrated in the organization of this book.

Other important ideas basic to the framework in this book were also developed in the course of the ACCIS TP/REM study. It was there that I began to focus on business transactions rather than records as the basic unit of archival documentation and on business applications rather than software applications as the source of the evidentiary significance of records on which appraisal and management are properly based. The TP/REM study clarified the practical threats to proper management of electronic records caused by the costs and irreversibility of systems migration. This led to the formulation of the program for the non-custodial archives of the future, published elsewhere under the title "Indefensible Bastions."³ The ACCIS report also brought to light the role that incorrect mental models of the operations of information sys-

tems play in preventing policy from being carried out, and the importance of training if staff are to be held responsible for electronic records creation and retention. Finally, it noted the importance of new genres of communications which will require evolution of broader cultural norms, an idea I have explored in discussions of virtual documents published elsewhere.⁴

That the absence of appropriate policy can effectively undermine accountability for electronic records is illustrated in the case of the electronic mail systems of the White House during the Reagan and Bush Administrations described in Chapter Four. A long series of Federal court rulings, most of which went against the government, underlined the importance of policy in ensuring the creation of evidence. When this paper was written in the summer of 1993 after the final ruling of the U.S. District Court of Appeals, the functional requirements for recordkeeping systems had been articulated by experts convened in the University of Pittsburgh study and by colleagues involved in my Monash University workshops and the concept that archives were in the "evidence business" was part of the framework for managing electronic evidence. It was gratifying to see that the court ruled that to secure evidence it was essential to retain what I had been calling "context and structure data," in addition to content data. Its decision that paper printouts lacking transmission information were not adequate records affirmed the theoretical construct that evidence consists of content, structure, and context data. Unfortunately, the court did not articulate a principle but only provided an example. Since then some commentators and government officials charged with implementing the court ruling have assumed it only applies to information about senders and recipients of electronic mail messages and other "transmission data" rather than understanding it as an illustration of a broader rule about contextual and structural data giving information that would not otherwise be a record its meaning and its adequacy as documentation or evidence.

DESIGN AND IMPLEMENTATION APPROACHES

My fullest elaboration of the concept that records are evidence, and that evidence consists of content, structure, and context data, appears in a talk given at the National Archives of Canada in February 1991, reprinted here as Chapter Five. It reviews the threats to "evidential historicity" posed by a number of common software applications. The role of standards for interoperability and the fundamental problem of preserving software-dependent data are discussed. Some questions which still remain unresolved are raised about the degree of functional similarity that is required for electronic data to function as evidence.

In the spring of 1993, the theoretical components of this approach to electronic records were sufficiently complete that I felt they would allow its application to any business application or technical environment. In Chapter Six the framework is applied to electronic mail, which serves as a vehicle for explaining how the conceptual framework of the Open Systems Environment (OSE) model serves as a scaffolding on which to erect means to intervene in system design and implementation. Concrete suggestions for methods of intervention are discussed and the concept that the "right" approach depends on local technology configuration and competence and local organizational culture, which are discussed more fully in Chapter Ten, are introduced.

THE STANDARDS APPROACH

One constant theme in discussions of electronic records management has been the attraction of technical information systems standards as a means of solving all our problems. While it is tautological true that interoperability would resolve the problems of maintaining records across systems over time, interoperability is still a long way from being achieved. Archivists need an assessment of both the potential of various standards for satisfying recordkeeping functional require-

ments and the chances that they will be adopted. Chapter Seven, written in response to a request for such an assessment, was delivered at an international conference on archives in Maastricht, Germany, in October 1991. The assessment effort must, however, be ongoing. In addition, archivists need to take the functional requirements for recordkeeping which they have established and identify define how new standards suites could serve to satisfy them.

In addition to information technology standards, archivists need to adopt standards for the documentation of electronic records. Building on observations I have made elsewhere that archival information systems are information systems about information systems, or what information technologists call "metadata systems,"⁵ we are led next to ask why and how to capture such metadata. The proposal made in Chapter Eight reflects the conjunction of approaches to electronic records with efforts to define the premises of archival description that began with work on the National Information Systems Task Force and was incorporated into the description framework proposed by the Working Group on Standards for Archival Description.⁶ The central concept here is that the information which we must have to describe archival records can be determined in advance because it is based on functional requirements for recordkeeping, the genre of the record, and the evidentiary requirements of the business application. In electronic environments, a specification of this metadata will enable us to design and implement systems to automatically capture metadata documentation when the records are created, and ensure that necessary metadata are incorporated into records when they are migrated, transferred, or accessed.

IMPLICATIONS FOR ELECTRONIC RECORDS PROGRAM STRUCTURE

While Chapters Three through Eight examine the means we have to control electronic records using policy, design, implementation, and standards, they do not help us to choose

the optimal approach for satisfying a specific functional requirement in a given institutional context. Chapter Nine reflects on the way in which national and organizational culture might impact on the selection of a tactic. While it does not explicitly develop the implication that each functional requirement could be satisfied in a different way, this is implicit in all discussions of program management frameworks and strategies and was instrumental in the research design of the University of Pittsburgh electronic records study where organizational culture was one of the variables being studied in the choice of tactics to satisfy each separate recordkeeping requirement.

Chapter Ten examines the ways in which archival organizations have adjusted or might transform their approaches to all records in order to deal more effectively with electronic records. Options -- such as proactive systems specification and implementation, non-custodial archives, metadata management for documentation and control, and records scheduling based on organizational function analysis -- are introduced and examples are given of organizations trying these innovative approaches. Dozens of more radical ideas for restructuring or reinventing archives, going far beyond what has been tried, are proposed in an article by Margaret Hedstrom and me that was written in the summer of 1993.⁷

NOTES

¹ Each chapter contains a footnote documenting its publication and prepublication history.

² Publications by David Bearman, relating to electronic records in archives during the period 1989-93 which are neither reprinted here nor specifically cited in footnotes 3-7 below, include:

Archival Methods, Archives and Museum Informatics Technical Report #9 (Pittsburgh: Archives and Museum Informatics, 1989).

"The Case for Software as Documentation," *IASSIST Quarterly* (Spring 1989): 18-23.

"The Impact of Information Format on Management and Policy," in James A. Nelson ed., *Gateways to Comprehensive State Information Policy* (Lexington, Kentucky: Chief Officers of State Library Agencies, 1990): 22-26.

"Electronic Records Issues," *Archives and Museum Informatics* 4:1 (1990): 7-9.

"Electronic Office Records," *Archives and Museum Informatics* 4:1 (1990): 12-15.

"Technology's Impact on the Professions Who Manage it," *Current Issues in Government Information Policy Conference Proceedings* (Frankfort: Kentucky Information Systems Commission, 1991): 11-23.

"Information Technology Standards and Archives," *NAGARA Clearinghouse* 7:3 (Summer 1991): 10.

"Developing Guidelines for Electronic Records: Report of a Project to Test the ACCIS TP/REM Electronic Records Guidelines: A Manual for Policy Development and Implementation (ACCIS 89/018(b) 1989-07-17)" in Advisory Committee for the Co-ordination of Information Systems, *Management of Electronic Records: Curriculum Materials* (New York: United Nations, 1992): 137-147.

"The ICA Principles Regarding Archival Description," *Archives and Museum Informatics* 6:1 (1992): 20-21.

³ David Bearman, "An Indefensible Bastion: Archives as a Repository in the Electronic Age," in *Archival Management of Electronic Records*, David Bearman ed., Archives and Museum Informatics Technical Report #13 (Pittsburgh: Archives & Museum Informatics, 1991).

⁴ David Bearman, "Multi-sensory Data and its Management," in *Management of Recorded Information: Converging Technologies*, ed. Cynthia Durance (New York: K.G. Saur, 1990): 111-120.

⁵ David Bearman, "The Impact of Information Format on Management and Policy," in *Gateways to Comprehensive State Information Policy*, ed. James A. Nelson (Lexington, Kentucky: Chief Officers of State Library Agencies, 1990): 22-26. David Bearman, "Contexts of Creation and Dissemination as Approaches to Documents that Move and Speak," in *Documents that Move and Speak: Audiovisual Archives in the New Information Age*, Proceedings of a Symposium, National Archives of Canada, 30 April-3 May 1990 (New York: K.G. Saur, 1992): 140-149.

⁶ David Bearman, *Towards National Information Systems for Archives and Manuscript Repositories: The NISTF Papers* (Chicago: Society of American Archivists, 1987); David Bearman, "Archival Description Standards: A Framework for Action," *American Archivist* 52 (Fall 1989): 514-519.

⁷ David Bearman and Margaret Hedstrom, "Reinventing Archives for Electronic Records: Alternative Service Delivery Options" in *Program Strategies for Electronic Records*, ed. Margaret Hedstrom, Archives and Museum Informatics Technical Report #18 (Pittsburgh: Archives and Museum Informatics, 1993): 82-98.

For Seizing Electronic Evidence. v.3. A Pocket Guide for First Responders. U.S. Department of Homeland Security. United States Secret Service. Best practices for seizing electronic evidence. This third edition of the Best Practices for Seizing Electronic Evidence was updated as a project of the United States Secret Service and participating law enforcement agencies. Electronic evidence must be collected with a reasonable and least intrusive means. The manner of collection depends upon the system configuration encountered, type of investigation at hand, and the most pertinent evidence being sought to support the investigation. Nearly every choice a forensic examiner makes, or doesn't make, during the collection process affects data to a certain extent. The examiner needs to be aware of the