

Management Summary

BUTLER COX  
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Electronic Document Management



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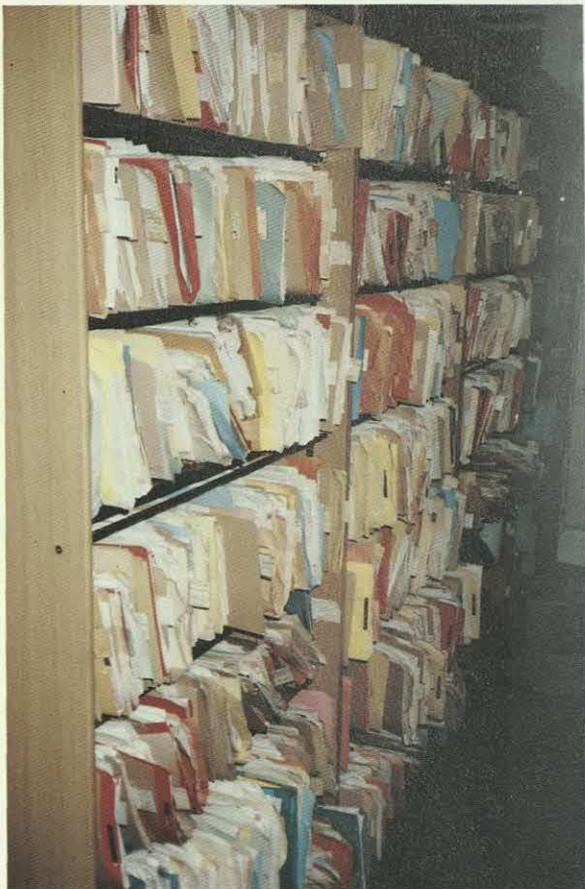
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Electronic document management (EDM) is a new combination of technologies and techniques that can be used by organisations to convert many of their paper-based systems to electronic working. EDM systems hold entire documents and files in electronic form, enabling staff to access all the information they need from a computer terminal, in a consistent manner. The contrast between the traditional and new ways of working is illustrated in Figures 1 and 2.

**Figure 1** EDM can be used to convert paper-based systems to electronic working



The benefits can be substantial, despite the high level of investment required. One organisation invested nearly \$2 million in an EDM system to hold research reports and published literature. The benefits in productivity improvements and space savings gave a payback period of two years and an annual return on investment of 57 per cent.

Even though Foundation members are aware of the benefits that can be obtained, EDM is not, as yet, widely used. Systems departments are cautious about introducing it because of concerns in a range of areas — from the performance of the technology itself, to the legal implications of its application. These concerns are understandable because the concept is still quite novel. We believe, however, that the technology has now reached the stage where it can be used to advantage by a wide range of organisations.

## EDM handles all types of documents

The term 'EDM' was coined by Butler Cox to describe the use of information technology to hold complete documents electronically, to provide users with a common means of accessing documents (or parts of documents) of all types, and to manage the organisation of, and access to, whole sets of documents. EDM systems are based on a combination of familiar technologies and others that are still relatively novel. The

**Figure 2** With EDM, all types of documents can be accessed via the same terminal



breakthrough is the way that these technologies are combined to bring together information of different types, held in different forms, at the user's workstation. The five components of a typical system are:

- Conventional data processing and database systems, which handle the data components of documents and the index to the documents.
- Office systems, particularly word processing and electronic mail, which provide the text components of documents.
- Full-text-retrieval systems, which in some applications provide powerful indexing and retrieval facilities.
- Document image processing, which enables documents in their entirety, including text, illustrations, and even handwritten comments, to be captured and stored (usually on optical discs).
- Workflow software, which allows document images to be managed together with the associated data and text. Workflow software is an essential element of an EDM system, and is used to define the procedures for capturing, indexing, storing, processing, and retrieving documents.

It is the combination of the first three more-familiar components with the newer ones of document image processing and workflow software that makes EDM so powerful.

### EDM is most appropriate for large volumes of information in frequent, current use

EDM is best suited to handling large volumes of documents, although the type of application does have to be chosen with care. Experience has shown that there is little value in applying it to handle information that is no longer current. In fact, until recently, both users and suppliers misunderstood where to apply the technology to obtain the greatest benefits from it. Several of the earliest commercially available optical disc systems were marketed by microform suppliers, and the systems were seen originally as a new way of storing archival information.

The true potential for EDM began to emerge when a few, far-sighted companies recognised

the value of applying it to information in frequent, current use. These companies were typically in financial services or had extensive research departments, where the volumes of documents in active use are enormous, and where there is strong commercial pressure to reduce costs and speed up operations. Similar applications exist in most sectors, and we expect EDM to become very much more pervasive across a wide range of businesses over the next few years. Figure 3 shows some examples of potential applications.

To decide whether EDM is appropriate, it is necessary to look both at the nature of the information being handled and at the alternative ways of handling it. Figure 4 illustrates how this process works. The information must be live (rather than archival). It must be used either in transaction applications or in reference applications. (Transaction applications are those where documents form

**Figure 3 There is potential for EDM applications in a wide range of businesses**

Sector	Examples of potential applications
Banking	Corporate finance market and client information Renewing advances
Consumer credit	Customer applications and enquiries
Building societies	Mortgage applications and enquiries
Insurance	Handling of claims
Law	Precedents and case histories Contracts
Chemicals and pharmaceuticals	Research documentation Regulatory submissions Standard operating procedures
Energy	Research documentation Technical documentation
Construction and engineering	Project and technical documentation
Airlines	Personnel records Technical manuals and procedures
High-technology manufacturing	Technical manuals Production documentation Engineering documentation
Low-technology manufacturing	Plant records Market research reports
Health care	Patients' notes and case histories
Central and local government	Case files Personal records on members of the public Registry management
Professional services	Client reports
Police	Criminal records

part of a step-by-step process — usually, where a similar series of activities is performed for many cases; reference applications are those where important documents need to be used by several different people over a long period of time to provide information essential to their work.) The information must also be unstructured (with unpredictable contents and layout), of high value (contributing directly to operations or decision-making), and with demanding access requirements (in terms of speed, frequency, or simultaneous access by several people). If the information meets these criteria, EDM may well be appropriate.

It is important, however, to avoid installing an EDM system that may quickly be displaced by an alternative technology. For example, EDM might appear to be an attractive method for capturing and processing invoices and order forms sent in from outside the organisation, but

if these operations are likely to be carried out in future via electronic data interchange, there is little point in investing in EDM today.

The working procedures used to process documents are a further important consideration, because the full potential of EDM cannot be realised merely by superimposing it on existing procedures. System designers should not simply automate the current working practices. Instead, they need first to understand what results the organisation is trying to achieve, then to modify working methods accordingly. The stimulus to consider EDM will often come at a time of major change — such as introducing a new service, or relocating to a new office — and it is easier at such times to introduce the new procedures that will inevitably be required.

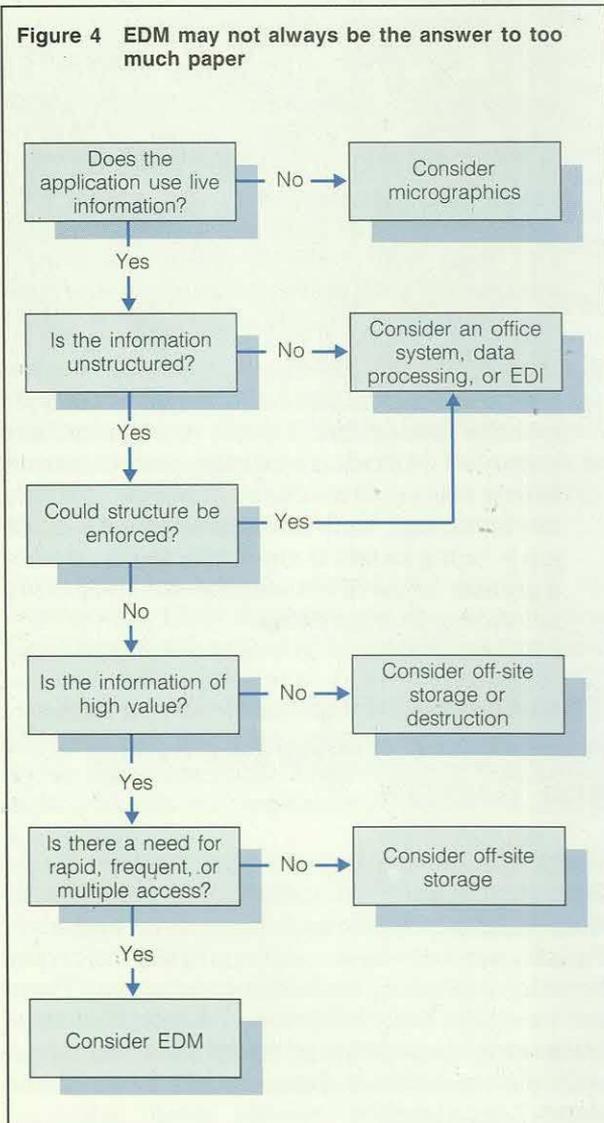
### Despite the high cost, the benefits can provide a rapid payback

A substantial investment is needed to purchase a worthwhile EDM system — typical hardware costs range from \$0.5 million to \$2 million. In addition, there are the costs of redesigning working procedures and integrating EDM with existing computer systems. Figure 5, overleaf, shows the investments, payback periods, and benefits of some of the EDM applications examined during our own research. EDM needs to be implemented on a fairly large scale before it becomes worthwhile, because the benefits often derive from sharing documents between users and automating document flows between various individuals or groups. The wider the user base, the bigger the system that can be justified, and the greater the benefits — both quantifiable and unquantifiable.

The most common quantifiable benefits are improved staff productivity and the reduced need for office space:

- EDM can transform the efficiency of many paper-intensive operations, particularly when it enables activities that would previously have taken an extended period of time to be performed in a single step. Given access to comprehensive records on a single screen, staff can access information far more quickly than by retrieving it physically.
- The time spent maintaining and storing files of information can also be substantially reduced. Manual filing, or filing into a micrographic system, is time-consuming, and

Figure 4 EDM may not always be the answer to too much paper



**Figure 5** Despite the high investment, EDM can produce rapid payback and substantial benefits

Application type	Investment (total)		Payback period and benefits
Mortgage handling	Hardware	\$1.80 million	Payback period: 3 years Benefits: Staff reductions Reduced staff turnover Space reductions
	Design and implementation	\$0.16 million	
	Software	\$0.30 million	
Research records	Hardware	\$1.08 million	Payback period: 2.1 years Benefits: Better use of professional staff time Space reductions
	Design and implementation	\$0.27 million	
	Software	\$0.54 million	
Loan handling (including OCR)	Hardware	\$2.50 million	Payback period: 2 to 3 years Benefits: Reduced need for bulk data entry
	Design and implementation	\$0.60 million	
	Software	\$0.70 million	
Hospital records	Estimated total based on pilot	\$2.50 million	Payback period: 2 to 3 years Benefits: Reduced storage costs Reductions in administrative time

costs of between \$5 and \$10 per 100 sheets filed are not unusual. Using EDM, almost all of the manual processes can be eliminated, and the danger of loss of information through misfiling is minimised. A recent study showed that the introduction of EDM into a large teaching hospital, responsible for filing 325,000 case notes and 1.3 million pathology forms, would reduce filing costs by \$0.5 million a year.

- Improved management and control brings further productivity gains. With EDM, work outstanding from before a specified date is automatically presented for action, so it passes through the system faster, thereby reducing the need for progress-chasing enquiries.
- Significant cost savings can be made because less office space is needed. Optical media have very high storage capacity, which means that large volumes of information can be stored in a small space. Once EDM is in place, the original paper copies can be either removed to inexpensive off-site storage or thrown away. Cost savings can be substantial, particularly in areas where office-accommodation costs are high and increasing.

The unquantifiable benefits of EDM applications can be as valuable as the quantifiable ones:

- Very often, the primary motivation is to speed up throughput to improve customer service or to gain some other competitive advantage. Speed of operations is becoming increasingly important in today's fast-moving business environment, and EDM can

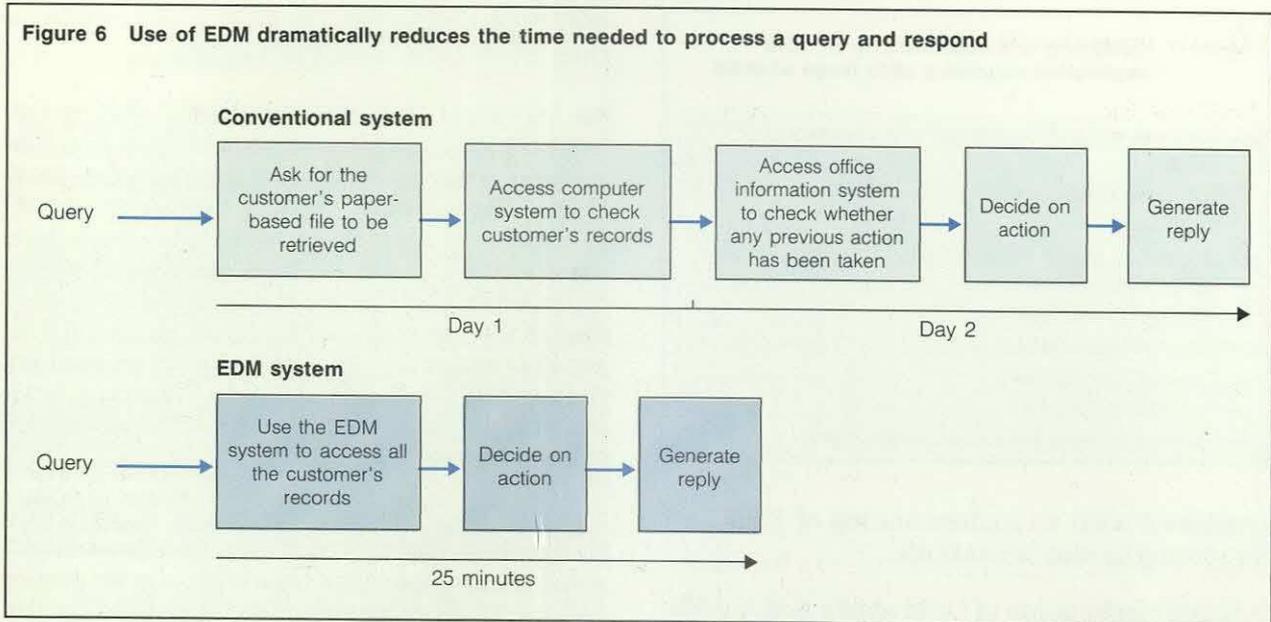
significantly reduce the time it takes to complete many important operations (see Figure 6).

- Improvements in internal services brought about by EDM may often benefit an organisation's customers — researchers with easy access to a wide range of source material are able to make the results of their research available earlier; medical staff with access to records held in various registries can deal with patients more efficiently; contractors with access to drawings and legal documents can quickly settle queries raised by project managers.
- Early users of EDM have found that staff morale improves. Paper mountains are removed, offices are cleaner, and there are fewer customer queries. A better working environment, and the perception that the job is being handled more efficiently, create a greater sense of satisfaction for the person providing the service.

### The limitations can be overcome by careful planning and design

Users still have concerns that prevent them from exploiting EDM applications as rapidly as they might. Certainly, EDM has technical limitations, but these can usually be overcome by careful planning and design of systems. There are two types of limitation — those that arise from the combination of EDM with other systems, and those that are inherent in the technology itself.

**Figure 6 Use of EDM dramatically reduces the time needed to process a query and respond**



The most valuable applications involve integration between the components of EDM technology and other computer systems. Transaction applications need to be linked with existing operational data processing systems, and reference applications require integration with office systems (to capture and distribute documents) and with information retrieval (to provide common access paths). Integration between EDM and existing systems is complex, because many of the more advanced EDM systems are provided by suppliers who are not mainstream data processing and office systems suppliers. The integration difficulties can be minimised by being highly selective and providing only the level of integration that is actually needed, which will be different for different applications.

The same principle should be applied to networking EDM applications, because of the high bandwidth required to transmit document images. Although local networking of EDM systems is commonplace, most user organisations are delaying wide-area networking involving images until high-capacity wide-area networks become more cost-effective than they are today.

There are also some inherent constraints because the combination of technologies that comprise EDM is still relatively new. Image processing is quite different from data and text processing because of the sheer volume and unstructured nature of document images. In addition, optical discs, while offering very high capacity, have slower access times than

magnetic media, and most optical discs today are not rewritable. This means that EDM applications must be designed with particular care if efficient operation is to be achieved.

The technology is developing rapidly, however, and many of today's problems will be overcome within three to five years. In the meantime, special attention needs to be paid to devising working procedures that will both improve efficiency, and minimise the impact of the limitations of EDM. For example, one way to ensure that slow response times do not have an adverse effect on efficiency is to transfer the group of documents that will be required to higher-performance magnetic disc. The selection of equipment can also be an important factor — the right equipment will depend on the characteristics of the application.

### Introducing EDM demands an unfamiliar mix of skills

With the introduction of EDM, systems departments will be working with equipment that is often unfamiliar and that requires skills rarely found in the conventional systems environment. Figure 7, overleaf, lists the mix of skills that is required. The emphasis varies for each stage in a project. Organisation and methods (O&M) skills and a good understanding of document-handling procedures are important in the early stages, when opportunities are being identified and decisions are being taken on whether EDM is appropriate. Later stages require skills in high-level business analysis,

**Figure 7 Designing and implementing an EDM application requires a wide range of skills**

- Business analysis, combined with knowledge of EDM.
- Technical EDM skills.
- O&M skills.
- Understanding of the existing systems with which EDM needs to connect.
- Information management.
- User communications.
- Systems development.
- Systems integration.
- Training and organisational development.

combined with an understanding of EDM and its strengths and limitations.

It is this combination of O&M ability and specific technical knowledge that distinguishes EDM from other information technology disciplines. In the early days, organisations with a strong O&M department will be better placed to exploit EDM than those in which O&M has been allowed to lapse. In the longer term, we predict that a new breed of 'EDM analyst' with the right combination of skills will emerge. In the meantime, organisations will have to make good use of their in-house resources from within and outside the systems department, supplementing them as necessary with external resources from consultancies, suppliers, and systems integrators.

## Success requires high-level planning and coordination

EDM requires large-scale investment and a unique combination of skills to generate large-scale returns. This means planning and coordination by the systems department to ensure that the whole organisation benefits from the investment, not just a few individual departments. It also means establishing strong partnerships between the systems department and user departments, and with others able to contribute particular expertise, for each application.

Only about one in ten of the organisations we surveyed has established the necessary high-level planning and coordination functions. Senior systems managers are often not fully aware of what EDM has to offer and are sceptical about its practicality today. As a result, individual user departments frequently take the

initiative themselves, buying in the expertise they need from external sources.

At one level, this route is highly successful, because it is a quick way of achieving benefits without diverting scarce systems resources from their mainstream data processing work. However, organisations should learn from their experience of introducing other new types of information technology, like personal computers and office systems. They must be careful to avoid creating separate 'islands' of technology that are difficult and costly to integrate, both with each other and with the mainstream computing infrastructure.

The solution lies in establishing a corporate framework, within which user departments and the systems department can each play its proper role in an EDM partnership. It should be the systems department's responsibility to ensure that the application boundaries are drawn sufficiently widely to provide this corporate framework for EDM. The corporate framework needs to include guidelines on:

- Policy issues, such as the selection of suppliers (for example, to ensure that newcomers as well as mainstream IT industry suppliers are considered).
- Management issues, such as how projects should be conducted, and how the conversion of large numbers of existing documents should be carried out.
- Legal issues, such as 'best evidence', copyright, and data protection, in the context of EDM. Expert advice we sought suggests that the legal status of an electronic copy of a document presents no special difficulties.

Within this corporate framework, the systems department should support and encourage individual EDM initiatives, focusing on the five critical success factors shown in Figure 8. The role of the systems department is to contribute specialist technical skills, and to ensure that other skills (especially O&M) are built into the team. The role of the user department is to 'own' the EDM project, to contribute to the requirements specification and the business case, and to ensure that working procedures are changed to achieve the benefits.

Provided that the systems department accepts the additional responsibilities that EDM will undoubtedly create, and takes up the challenge

**Figure 8 Five factors are critical for the successful management of EDM**

Major activity in managing EDM	Factors critical for success
Defining applications	Rigorously applying selection criteria Reviewing working methods
Designing with EDM in mind	Defining the new workflow Taking the technical issues into account
Choosing the right supplier	Applying selection criteria Understanding the market
Coordinating the use of EDM	Integrating systems Building a partnership between systems departments and users
Making appropriate staff available	Providing the right mix of skills Using external support where needed

that management of the new systems will require, significant benefits will be achieved for the whole organisation. No Foundation member can afford to ignore it.

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