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# Information management approaches to digital asset management: A case study in success and failure

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## Katharine Schopflin

is a freelance knowledge and information manager with 18 years' experience in sectors ranging from media to government to financial services, now consulting on knowledge management, information management and taxonomy projects. She is the author of 'Handbook for Media Librarians' and the recent 'Handbook for Corporate Information Professionals' and writes and speaks regularly on information issues. She is also part-time Honorary Lecturer at UCL's Department of Information Studies.

E-mail: [katharine.schopflin@gmail.com](mailto:katharine.schopflin@gmail.com)

**Abstract** This paper explores the applicability of information management theories and techniques to digital asset management (DAM). Using a case study of a DAM implementation, it explores the successes and failures of the system in relation to the extent to which it utilised good information management practices. It concludes that, while some success was obtained, cultural reasons meant that the crucial principles of universal accessibility and consistency were not mandated and inefficient practices survived the adoption of DAM.

**KEYWORDS:** DAM, information management, organisational change

## INTRODUCTION

Fundamental information management principles, such as 'the single version of the truth' and 'create once, use many times' are highly applicable in digital media environments. In an ideal world, content and metadata would be captured in a single digital asset management (DAM) system at the earliest possible point of creation and added to and improved throughout the asset's working life before being made accessible for future retrieval. But in real life, assets are often uploaded to systems with inadequate or inconsistent metadata and content is created and published in systems incompatible with

long-term retrieval. This paper examines the theory and principles of good information management and examines a case study, where failure to observe them resulted in inefficiencies and potentially compromised information.

## BACKGROUND TO INFORMATION MANAGEMENT

The principles of good information management are the basis for organisational information strategy. A response to the recognition of the importance of information in organisations and the problems related to

information management practice emerged in the 1990s. According to the Hawley report,<sup>1</sup> an influential document commissioned from consulting firm KPMG, senior executives were concerned that they had lost control over the information in their organisations, at the same time as becoming increasingly aware that, in a service rather than a manufacturing economy, well-managed information was going to be essential for them to maintain their competitive edge.

Although substantially theorised within the fields of management and IT, information management has become recognised as a core discipline within the field of library and information studies. Within this field, numerous attempts have been made to outline the principles of good information management. Jela Webb<sup>2</sup> suggests that information is managed well when it is:

- efficiently identified and stored;
- accessible at all points during its existence and by all relevant employees;
- used responsibly with regard to compliance;
- managed like an asset equivalent to land, staff and capital;
- 'viewed as the currency of competitiveness'; and
- prized and respected.

She adds that information should be available at the right time, in the right location and to the right people. For her, good quality information demonstrates its provenance (how accurate and authoritative it is), its context (how it can be used) and its worth to the organisation that owns it.

For Elizabeth Orna,<sup>3</sup> the importance of information management is that it enables organisations to make the best use of their assets by making them visible and manageable. She sees it as concerned with, among other things:

- acquiring, storing and making information accessible;
- developing resources that enable appropriate users to add their knowledge;
- ensuring resources are appropriate to meet changes in a workplace environment;
- reflecting organisational exchanges with the outside world;
- using IT appropriately and innovatively to support these processes; and
- making lessons of experience accessible as an information resource.

To some extent, Orna is most interested in the best means of capturing the tacit knowledge that emerges in the course of all operations, processes and transactions in the working of an organisation. She identifies the key to good information management as the interaction of staff with the tools made available to them and their motivation for using them to record their information.

The Hawley report<sup>1</sup> itself, specifically concerned with the commercial use of information, identified both information quality and how to obtain it. Well-managed information should be:

- available in appropriate amounts and appropriately accessible;
- timely and reliable;
- flexible, easy to gather and manipulate; and
- consistently recorded over time.

The report suggested the following measures to ensure the requisite quality:

- control permissions;
- create audit trails;
- generate lots of metadata;
- control versions of documents;
- assign ownership to important pieces of information;
- develop strategic asset registers to

ensure important information is identified; and

- develop retention schedules to ensure information is kept only for as long as it needs to be.

This advice was intended very much for a world of documents and unstructured information. In this world, staff scattered across an organisation create Word documents, spreadsheets and PowerPoint presentations and save them in private repositories. The documents may or may not contain vital corporate information, but nobody apart from their creators knows the source of this information, how up-to-date it is or what document to find it in. Clearly, guidance and principles that avoid such a situation are desirable, yet they are necessary for structured information systems and databases too. Organisations then and now need to know who created their information, who is responsible for it and how they can add metadata so that the information can be filtered, searched and manipulated.

In the mid-2000s, these principles were expressed by information and information systems managers exploring ‘master data management’ (MDM). Developed specifically for the commercial sector and with customer data in mind, it was concerned with ‘creating a single source approach for management of master data based on high standards of quality and governance serving the entire business’.<sup>4</sup> Faced with a situation where departments across organisations were gathering the same information and holding it locally in inconsistent and incompatible forms, the principles were developed for tools that would enable ‘uniformity, accuracy, semantic persistence, stewardship and accountability’<sup>5</sup> in corporate information. This recognised that organisations needed processes that ensured certain crucial categories of data were managed (MDM practitioners refer to ‘data’ where others

might use the term ‘information’, that is, data from which useful meaning has been extracted and created):

- consistently across organisations;
- with assurance of accuracy;
- using sufficient metadata to be meaningful over time;
- by roles with responsibility for ensuring their integrity; and
- with due attention to information governance.

These principles too reflect the approach that lies at the heart of good information management.

As a summary of the sources above, information management principles seek to ensure that information is:

- of good quality in the first instance, reliable and authoritative;
- acquired into organisations efficiently;
- stored using tools that are fit for purpose and facilitate use by staff;
- accessible to all who need to find it and add to it, so they do not need to recreate it;
- identified using appropriate metadata as to its origins, subject matter and purpose;
- managed with due consideration for accountability and governance;
- consistently recorded over time and in different locations;
- flexible and usable for multiple purposes; and
- managed by roles with specified responsibility for its care.

This can be defined as a framework for information management, which can be used as criteria to judge the success of information operations and projects.

The advantages of this approach to managing organisational information are clear. Organisations can trust the information they have, manage it

efficiently, know where to find it and can reuse it. They can obtain the most value out of their assets, avoid duplication and be sure that they are acting responsibly and free from reputational or financial risk. Good information management tools and processes make it easier for staff to 'do the right thing' and treat information as a corporate asset, not a personal possession.

### **INFORMATION MANAGEMENT VERSUS DIGITAL MEDIA MANAGEMENT**

So how does this apply to digital media management? In some ways, the problems of managing media assets are more acute than those applying to written information. Any large collection benefits from cataloguing and indexing to enable specific information to be found. Much can be learned about a hard copy written object simply by looking at it. Even digital textual files, while they need to be sensibly titled, can release relevant content through a good full-text search tool without opening up and examining each individual file. Media assets, whether digital or analogue, need to be played, often using very specific equipment, in order to reveal their secrets. Leaving aside the use of automatic speech transcription, without metadata they are dumb objects, which become more mysterious as time elapses between the original content creation and attempts at retrieval.

The history of media management shows mixed success addressing these problems. Traditionally, national collections could to some extent be relied on to offer catalogues indicating the location and content of their holdings, although lack of standardisation and expertise meant they were far from trouble free. The British Library's Richard Ranft, for example, has described the limited amount of metadata and transcription acquired along with their fine collection of audio recordings.<sup>6</sup>

In the commercial sector, approaches were often haphazard and without professional intervention. Frank Chagoya<sup>7</sup> brilliantly paints the picture of how digital assets were managed before the advent of DAM systems:

'Files were organized in multi-tiered folder structures and stored on a wide variety of magnetic and optical media, leaving us captive to searching through digital or hand-written catalogues, directories or inventory lists to find our assets. Most often only a small number (two to three) of alphanumeric references were used as search criteria'.

The picture is exactly that of the chaos that information managers sought to solve: poor organisation, multiple repositories and inadequate metadata, leaving users unable to find vital and potentially revenue-generating content.

In theory, a DAM system would embody the principles of good information management and bypass these problems. According to Elizabeth Ferguson Keathly:

'A DAM system is a software system that, in combination with other systems, stores and distributes digital assets in a controlled and uniform way. DAMs arrange, describe, store, and provide access to digital assets that are linked to metadata models, which allow a digital asset manager to work with the assets in desirable ways'.<sup>8</sup>

Additionally, Keathly refers to workflow capability, whereby digital assets can be added and reviewed according to internal procedures, access control, audit trails (recording who is working with content) and the production of metrics. A DAM system should, therefore, provide the basis for staff adding metadata in a consistent way, recording all the information that is necessary to retrieve the asset and make it usable, with sufficient control to ensure that the data (and asset itself) are not

compromised. As Keathly herself indicates, a DAM system is only a tool and ‘should be part of a holistic digital asset management strategy’. To ensure that the asset system is used properly, strategies and procedures need to be in place. Additionally, as DAM systems tend to support audio-visual materials, rather than simply text, they offer technical challenges involving the support of differing, unstandardised formats with often complex and expensive storage requirements. During the process of acquiring a DAM system, these challenges are likely to take precedence in the decision-making process, making questions of governance and usability less pressing.

To some extent, the literature supports this. In recent years, case studies have appeared regarding the introduction of DAM systems in different workplaces. For example, McGovern<sup>9</sup> describes the strategic process of introducing a DAM system into a museum environment and cites the institution’s relevant policies, most notably intellectual property, collection development, technical specifications and metadata schema. Governance for all these is essential for successful DAM implementations, but the philosophy behind them, to ensure the authority, context and reusability of the product, is not mentioned. Similarly, Johnson<sup>10</sup> outlines the principles for managing moving image collections as promoting standards, embracing diversity and enhancing metadata. She identifies that the main driver was a need for a ‘standardized way to identify holdings’ but does not investigate why the answer was a DAM system. In both of these cases, the model involves a system used by professional collections staff, most of whose job functions motivate them to think of the long-term accessibility of their assets.

In a commercial environment, articles tend to focus on publishing workflows. This is an important part of embedding

good information management practice into DAM, but they are often led by what can be realistically expected of content creators. As Chagoya points out, the ‘initial user will be the person that uploads, ingests or generates the asset in the system,’ and urges DAM designers to ‘keep it simple’<sup>7</sup> rather than requiring adherence to rigid rules and strict governance. Where content creators are tasked with applying governance rules and adding metadata, the results can be mixed. Andrew MacFarlane<sup>11</sup> describes the problematic workflow of freelance photographers, where metadata are lost between the moment of creation and consumption, even though better metadata will help their pictures be picked up by agencies and matched to relevant briefs.

#### **A CASE STUDY IN INFORMATION MANAGEMENT FOR A DAM SYSTEM**

The following case study takes one example of the implementation of a DAM system and the extent to which it incorporated the principles of good information management. It illustrates where a new system was acquired in order to facilitate efficient publication and indexing of media assets, involving a mature content publishing organisation with an existing legacy of products and procedures. The research is based on direct observations from the author, supplemented by informal interviews.

The archive in question belonged to a medium-sized commercial broadcaster, which produced 15–20 hours of regular transmitted output each week. The archive was itself a large footage-sales operation, with rights over and distribution agreements with a number of third-party archives. The DAM implementation represented a considerable investment in improving access by offering browse-quality footage to end users. Local expertise was used to adapt third-party software for the

archive's specific needs. In addition, cataloguing rules and processes were rewritten as, now that footage was visible to the searcher, text became a means of retrieval rather than description. Timecodes were no longer needed because the cataloguer set the in-time and out-time of each shot. Each clip was segmented manually and associated with programme and copyright metadata and a physical description. The organisation chose not to use a taxonomy or authority file for financial reasons and to lower the reliance on skilled staff. Instead, retrieval was aided by the use of multiple synonyms in text descriptions. Information governance was embedded into the system. A copyright management system put publication restrictions on third-party copyright and cataloguers could additionally add restrictions where copyright music, privacy or the depiction of children might be an issue.

Any clips for which the archive owned the copyright and which were otherwise not restricted could be browsed on the public web, while all other new material was accessible from internally networked PCs. Legacy material was not ingested into the DAM system comprehensively. Instead, specific products (for example, archive sales compilations around specific themes and personalities) were developed to include legacy as well as more recent material, with archive researchers ingesting material from film and beta tape, attaching and adapting existing cataloguing entries. Anniversaries, upcoming or sudden events might also trigger an urgent ingest of footage around specific personalities or historical occurrences.

The process of acquisition before the move to DAM can be characterised as below:

- *Content capture:* Content creation>Broadcast>Some live cataloguing onto online system>Clean

feed clips supplied by broadcast engineers>As broadcast and clean feed clips saved to tape>Cataloguing completed within 24 hours of end of transmission date.

- *Research:* Searching online descriptive catalogue>Order tapes>View tapes according to relevant timecodes.
- *Internal broadcast re-use:* Tapes uploaded into broadcast production system>Relevant clip saved to server and used for edit.
- *Sales use:* Timecoded clips copied and sent to customer>Customer clips selection>Licensing and payment arranged>Final clip copied to DVD>DVD sent to customer.

Following the move to DAM, the process of acquisition can be characterised as follows:

- *Content capture:* Content creation>Broadcast>Broadcast transmission clip and clean feed made available from server by broadcast engineers>ingested into DAM system overnight>Cataloguers attach clips, segment and add metadata and descriptions.
- *Research:* Researchers view clips online.
- *Internal broadcast reuse:* Broadcasters able to download clips directly to server and use in edit.
- *Sales use:* Researchers able to search and view wholly-owned copyright material over the web>Some material purchaseable online>Most purchases require mediation from sales staff>Once licensed, clips made available to client by download where possible, or saved onto a DVD and sent off.

The new system vastly improved the ability of researchers to find viewable content and increased the efficiency of the archive sales operation. In some cases, where rights management was

straightforward, e-commerce transactions were possible (although the vast majority needed a human intermediary to manage the sale). The system reflected its two main objectives: (1) to enable easy access for footage researchers to well-segmented and described clips; (2) to ensure the copyright integrity of what was available online. From the archive sales point of view, the system was a success and, in spite of inevitable struggles during the change management process, within a year cataloguers were working efficiently and relatively content to be freed from the labour of logging and timecoding.

As a broadcasting DAM system, it had significant flaws. Despite efforts to involve the broadcast production part of the organisation, it had invested in its own in-house content production system and had no interest in investing in DAM. Although they were significant users of archive footage themselves, their funding priorities were around the production and sale of new content for scheduled broadcast. The afterlife of their output was not a priority. This meant that rather than being created directly into the DAM system, programmes were made using separate broadcast systems and ingested after transmission. In the case of rushes, a significant generator of useful generic or personality-based pictures for footage sales, the content actually arrived in the archive on tape, thus being no more advanced in format than any uningested legacy material in the archive.

In timeliness terms, cataloguing content had in some cases slowed. At its most efficient, the original archive operation had been able to add basic cataloguing information during live transmissions, although these would be substantially edited after the event (and the archive could not always live up to these standards). Now cataloguing had to take place after the clip became available for ingest. This happened by negotiation with

broadcast technicians after transmission. Sometimes technical problems occurred and these were not a priority for the production operatives to fix. By agreement, the earliest possible time that a lunchtime news bulletin would appear on the system would be the following morning. At this stage, cataloguers attached programme information to the clips that had been ingested into the system and then went through each, segmenting and describing the content and applying copyright and restrictions.

Knowledge of copyright and subject information (such as the identity of people interviewed or location of events) was not always possible to ascertain. Although content creators were best placed to know the copyright origin of their content, and were officially responsible for adding it into their production system (in unstructured notes attached to the running order), they often provided very little or inaccurate information. This put a burden of research on the cataloguers and in many cases resulted in potentially saleable footage marked with an unknown copyright because it could not be confirmed. Important metadata around people and places also had to be identified through research. As it was frowned upon for archive staff to approach creative staff directly, e-mails were sent to support functions in the production areas and often not answered. In many cases, the content creator simply no longer had the copyright information as it had not occurred to them that it was important.

The following summarises how far this case study met the nine requirements for good information management discussed previously:

1. *Of good quality in the first instance, reliable and authoritative:* Existing procedures and structures meant the archive only received material from its own broadcast

- parent organisation or from archive sources it had itself approved. It had no control, and often no information, about the source of some of the footage that appeared in in-house broadcasts.
2. *Acquired into organisations efficiently:* The content was created entirely in one system then downloaded and ingested into another, at which point all structure and metadata had to be added from scratch. From the perspective of information management this does not represent an efficient workflow.
  3. *Stored using tools which are fit for purpose and facilitate use by staff:* The DAM system was designed specifically to facilitate attaching clips, segmenting content, describing it and applying metadata. As there was no involvement from the content creators, the system was fit for purpose only for tasks carried out by archive staff. It was not developed as part of the programme production workflow.
  4. *Accessible to all who need to find it and add to it, so they do not need to recreate it:* The system was, by the choice of content creators, only accessible at input level by the archive. Thus, content had to be imported from the archive's own systems and information known to content creators was lost.
  5. *Identified using appropriate metadata as to its origins, subject matter and purpose:* Metadata were added after transmission, and research often had to be carried out to ensure quality and completeness. At times, people, places and copyright remained unidentified because the information could not be ascertained.
  6. *Managed with due consideration for accountability and governance:* The system was specifically designed not to publish material with a copyright not under the control of the company. Cataloguing staff were well trained and highly cognisant of the importance of correct metadata regarding copyright and privacy restrictions. Content creators were not as concerned, meaning that original information about correct copyright could not always be applied (resulting in more restrictions than necessary being applied to the material).
  7. *Consistently recorded over time and in different locations:* No structures in the DAM system reflected the work of content creators, although all parts of the archive (that is, legacy cataloguing and rushes, as well as the daily cataloguing operation) worked to consistent rules. Creatively produced material arrived in the archive unstructured and rules were applied at the end stage of the process.
  8. *Flexible and usable for multiple purposes:* The segmentation and addition of metadata by cataloguers added flexibility and usability to the content. The fact that no authority file or taxonomy was used in the course of cataloguing may have limited its use. Outside of its connection to broadcast transmission dates and copyright, the catalogued data were largely unstructured. In short, a decision taken for reasons of finance and simplicity, compromised the flexibility of the data.
  9. *Managed by roles with specified responsibility for its care:* Dedicated, trained and responsible staff were responsible for ingesting material into the system and describing it in a way that it could be found again. The existence of the archive as an entity, including specialist preservation staff, meant that an ongoing operation was in place to ensure continued access through technological obsolescence. Some of the most vital information, about the origin of clips, where they were filmed and when, remained stuck inside the heads of the content creators and had to be recreated, with compromises, by the cataloguers. The content creators themselves had no motivation or real



processes for ensuring that reliable information was provided.

The extent to which the DAM implementation observed information management principles directly reflects its successes and failures. Embedding good governance for copyright and privacy law in the structure of the database meant that it was very difficult for staff to publish material over which the organisation had no rights. The system itself was well designed to facilitate the adding of descriptive content to relevant clips at the correct in and out time, making the work of sales and programme researchers far easier, more efficient and more relevant, as they could browse and download footage, rather than ordering and waiting for tapes that may or may not have had what they were looking for. The complete incompatibility of the programme production system used by content creators with the DAM system caused immeasurable inefficiencies across the organisation. Any information, structured or otherwise, added at the point of creation was lost by the time the programme was ingested into the DAM system. Cataloguers had not simply to duplicate work of content creators, but to research from scratch what the latter would have known themselves at some point. The decision not to implement a taxonomy caused only minor problems during the initial roll-out, because the small quantity of content in the system was reasonably accurately searchable using free text (and with the addition of synonyms). It is likely that after many years' addition of cataloguing descriptions, free text will prove inadequate.

The reasons for the failures were not inherent to the DAM system, which could have been designed for input at the point of creation, and have supported structured vocabularies. Rather, the problems were cultural. The content creators were more

important in the organisational hierarchy than the archive and could not be forced to use a production system designed with long-term retrieval in mind. The flow of information from creative to archive staff was stymied by internal customs and siloed working.

Clearly, a single example cannot be representative of all DAM implementations. This case study illustrates how failure to fully implement information management principles in DAM projects can compromise their potential for success. That it is not an isolated example, nor one from which lessons have been learned, is indicated by the more recent failure of the high-profile BBC Digital Media Initiative (DMI) Project. Designed as a means of integrating the production and archive processes, by providing 'digital production and desktop tools [to] help ensure future content and data could be captured, edited and made available at each step of the production process', it was closed in May 2013 after a spend of £98.4m.<sup>12</sup> The subsequent review suggested that cultural problems were a major part of the project failure:

'Delivery of a single set of processes and the required change in business operations were a pre-requisite of successful delivery of the benefits recognised in the 2010 Business Case. DMI reporting focused on technology risks and issues rather than the ability of DMI to drive operational change to business practices in the BBC'.<sup>13</sup>

This suggests that the project was not abandoned because the technology did not exist to meet its needs. Rather, the project failed to address the cultural change that would have been necessary to mandate the use of the production system among BBC programme makers. Even where, unlike in the case study in this paper, the DAM project was a centrally driven corporate project, it was abandoned because the

integration of production content management and archive media asset management would have required the adoption of a new cultural outlook among programme makers, which nobody was confident could be delivered.

The organisation in the case study continues to use a separate content production tool from the DAM system. The BBC, however, has not abandoned its aims towards integrating media asset management from creation to archiving. Its 'End to End' programme, currently underway, will use an agile approach to reach the same ends.<sup>14</sup> It is to be hoped that this programme will succeed where the previous one failed and, by doing so, demonstrate the potential of good information management in ensuring successful DAM.

It is clearly recommended that organisations should not embark on DAM projects without a clear commitment of involvement from all departments involved with the creation and description of media assets. Even today, where far less in-house expertise is needed, given the availability of off-the-shelf media asset solutions, a huge investment in process mapping, training and change management is needed for the implementation of a new DAM system. Why would organisations embark on such projects when their full benefits cannot be realised? The example in the case study, and that of the BBC, demonstrates the reluctance of organisations to tackle cultural problems and difficulty of challenging hierarchies and divisions between departments. The scale of the problem is indicated by the fact that when projects are initiated, it is seen as too hard to embed this type of essential change into practice.

Information management itself has a history of such compromises and many organisations are half-hearted in their attempts to instil a culture of information sharing and responsibility among all staff.

Yet much can be learned from organisations that do succeed. The development of an information management policy in the first instance, while it cannot itself change the behaviour of staff, acts as a pattern for senior managers to follow and refer back to when activities are under dispute. Day-to-day acceptance of good information management practice can be built up through offering solutions that make it easy for staff to save their information where other people can find it. Seeding content into corporate solutions demonstrates the value of doing so. Building good results for information management into project plans as a matter of course, and as an essential deliverable, is a powerful way to facilitate good practice in the future. Appointing information management champions throughout operational departments, with objectives and rewards for related achievements helps to instil a culture of good practice. All these can be backed up with good communication of the rewards of sharing information well and the financial and reputational risks of not doing so.

A clear recommendation for any content organisation considering implementing DAM solutions would be to develop some governance around corporate asset management and outline staff responsibilities and approaches.

Possible solutions might be:

- A top-level policy document outlining how the organisations assets should be managed.
- Job specifications and reward systems across the organisation embedding responsibilities towards asset management.
- Development of systems, interfaces and training, which encourages good use of the system and reflects the aims and objectives of individual workers.

- Good communication and building networks of support locally.
- Ensuring that project documentation reflects governance, which embeds asset management principles from the start.

All of these approaches have been found to facilitate good information management practices in organisations. To apply them to the procurement, implementation and development of DAM systems may help to prevent the problems that occurred in the case study described in this paper.

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