

# Weather Technology is the Most Important Factor in the Successful Management of Digital Assets in the Broadcast Media

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**Abstract:** With the expansion of business needs, Digital Asset Management (DAM) is increasingly developing. In the early days of DAM, it was an independent application module established by various departments according to their own needs. With the emergence of new media, broadcast media has broken through the traditional model, showing new trends such as digitization, service modernization and platform diversification. In the context of media convergence, a large number of digital assets are created every single day (Prihandoko & Antonius, 2015). Therefore, the need for effective DAM becomes increasingly evident in a range of domains, such as broadcast media. Most broadcast stations have experienced decades of development and they have accumulated a large amount of audio and video information, specifically, many of them are valuable historical assets. The effective preservation, management, and use of this information require DAM.

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## 1. Introduction

With the expansion of business needs, Digital Asset Management (DAM) is increasingly developing. In the early days of DAM, it was an independent application module established by various departments according to their own needs. With the emergence of new media, broadcast media has broken through the traditional model, showing new trends such as digitization, service modernization and platform diversification. In the context of media convergence, a large number of digital assets are created every single day (Prihandoko & Antonius, 2015). Therefore, the need for effective DAM becomes increasingly evident in a range of domains, such as broadcast media. Most broadcast stations have experienced decades of development and they have accumulated a large amount of audio and video information, specifically, many of them are valuable historical assets. The effective preservation, management, and use of this information require DAM. How to successfully manage

digital assets in broadcast media is a worthy question for digital asset managers and broadcasters. Mariátegui (2013) states that the development of the media industry and the expansion of technology are closely related. With the introduction of new technology, such as new digital production methods, new archives and new transmission channels, broadcast content and distribution processes are gradually changing. In addition, current technological development also makes it possible to integrate workflows. Therefore, there is a view that technology is the most important factor in the success of DAM in broadcast media. This essay will argue that, although technology has played an essential role in the effective management of digital assets, there are also many other factors, such as people, strategy, and information, which are also indispensable for DAM in broadcast media. In order to support the argument, this essay will be divided into four parts. First of all, a brief definition of DAM and broadcast media will be given, and the relationship between both of them will be

introduced. Then, I will critically discuss how the change in technology affected the success of DAM, before talking about other vital factors. In the end of this essay, there will be a brief conclusion and suggestions for further research of DAM in broadcast media.

## 2. What are DAM and Broadcast Media?

### 2.1 The Definition of Digital Assets and DAM

Lipsey (2010) gives the general domain of DAM: "DAM is the management of digital media throughout its lifetime". Stein and Thompson (2005) indicate that DAM is relevant to "the ingest, description, discovery, retrieval, searching, and distribution of collections of digital objects", and introduce the key tasks of DAM. Kavanagh (2016) proposed that, "DAM is the process for organizing, storing and retrieving rich media and managing digital rights and permissions". It involves workflows and business processes of organizations and can help them save time and money and help to manage data, information, and digital objects. Using a DAM system not only can make the digital lifecycle efficient, but also enables users to have easy, quick, and long-term access to digital assets (Widen, 2014). Therefore, DAM is necessary for organizations, including broadcast media.

As a core element of DAM, Nielerk (2006) claimed that a digital asset can be defined as any content that exists in a binary format, including application rights and various formats such as video, audio, documents, film, music, images, websites and many other data forms, which are managed among the workflow. DAM staff need to comprehend what digital assets are to successfully manage broadcast media.

### 2.2 The Definition of Broadcast Media

According to Peters (1999), "broadcasting is the distribution of audio and/or video content or other messages to a dispersed audience via any electronic mass communication medium, but typically one using the electromagnetic spectrum (radio waves), in a one-to-many model". There are many methods used for broadcasting, which mainly include television, radio, and mobile phone broadcasting, as well as cable radio and television, direct-broadcast satellite, satellite radio, webcasting of video or television, and audio or radio streams (Kleparski and Dr??ek, 2016).

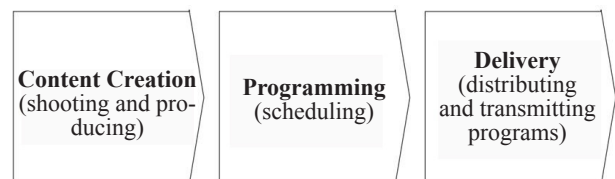
## 3. The Technology Factor of DAM in the Broadcast Media

According to Mariátegui (2013), the development of technology has always advanced the media industry throughout history. Küng and Leandros et al. (2008) explain that the use of electricity in the 19th century led to the development of the first telegraph system and the progression

of radio and television. Therefore, they argued that technology is the foundation of the media industry, and is also essential to the development of the broadcasting industry. For instance, technology in the broadcasting industry is mainly built on digital codification systems, integration of centralized data, and unified digital systems for communication technology, information transmission, processing and storage (Mackay & O'Sullivan, 1999). Therefore, digital asset managers should pay close attention to technology when they want to successfully manage digital assets in broadcast media. Kallinikos and Mariátegui (2011) proposed that, as a result of the development of the media industry, there are two cardinal technical problems that should be solved. The first is the interoperability between various formats and platforms to allow their administration. The second involves metadata technology, which ensures that digital assets can be identified and accessed for a long time. It is necessary to consider the workflow of broadcasting when DAM staff want to manage digital assets and help deal with these two problems.

### 3.1 Workflow

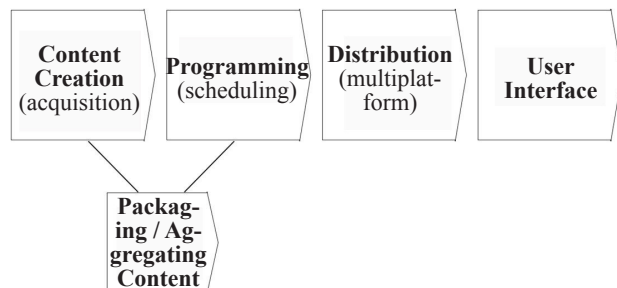
The process of content creation and distribution in the broadcast industry is not immutable. Küng (2008) proposed that traditional television broadcasting production was divided into three steps: content creation, programming, and delivery (as showed in Figure 1). Digital assets are produced at each of these operations.



(Küng 2008:54)

There are two main considerations when DAM staff wants to manage broadcasting digital assets. First, there is a technological black-box which is used to build proprietary standards and avoid technology competition from other organizations. Second, due to the first consideration, broadcast media organizations have to use special devices and proprietary standards at each of their three main steps. As a result, many other sub-steps began to emerge from the three main steps (Mariátegui, 2013). For example, according to Figure 2, in the television workflow, it is important, when reprocessing external content, to meet particular audience segments, which is called packaging/aggregating content. Similarly, the user interface step is important so that audiences can access the same content by various digital platforms such as websites, phones and tablets (Küng 2008). All of these operations in the broadcasting workflow need highly specialized systems for

implementation. Thus, broadcast media needs professionals who have the knowledge of broadcast technologies to operate the whole process, which can reduce the waste of time and money, to some extent. That is to say, technology in the workflow still needs to advance so that the whole process of broadcasting can be more efficient, which can drive the success of DAM in broadcast media.



(King 2008: 55)

Cinegy is a video editing software package which was central to the introduction of the Digital Media Initiative (DMI) at the BBC. DMI was designed as a production device that allows the staff to access BBC recordings, from the original material to the final editing, via the desktop (BBC, 2013). BBC Northern Ireland (NI) chose to use a DAM system based on the Cinegy workflow, which provides a good solution for NI's problems. As an example of DAM in broadcast media, Cinegy integrated with existing processes and technology, which improved the efficiency of production as well as reduced costs. Cinegy can adapt different sizes, has open standards and formats, and can provide solutions for future developments (Cinegy, 2010). The success of implementing the Cinegy workflow gives evidence that DAM is necessary to the broadcast industry and that technology is one of the most important success factors. According to Cinegy, the BBC NI has yielded revenue in terms of cost reduction. It avoids costs by implementing a standard PC hardware-based system in place of a costlier file-based solution which needs proprietary hardware. The BBC broadcasters can control the content on television and online, save distribution time, and can create an accessible archive for a long term production. The adjustment of workflow is the consequence of the appearance of new digital technology, new transmission channels, new digital production approaches, and an increased request for high quality content by audiences (Mauthe & Thomas, 2004). Current technological developments make it possible to integrate workflows to improve the efficiency of DAM.

### 3.2 Metadata and Archive

The key to managing digital assets is to understand which assets are present in inventory and how to locate them (Fowler, 2016). In order to achieve this, it is crucial to

have a common means to illustrate assets to ensure they are searchable. The descriptions of assets are called metadata (data about data), which are important to the successful implementation of DAM. The content production process usually begins with the planning of the programme, which combines the transmission schedule with the production plan. During this step, some original metadata is produced, then is enriched during the authentic production process, and is then linked with content objects at the end of the lifecycle. Afterwards, in order to manage digital assets, those metadata are ingested into the DAM system and are related to some existing content. This information can be searched and retrieved even while the ingest is still ongoing. The BBC is scattered across multiple websites in the UK, with complex and diverse programs and procedures; therefore, technical standards are critical to their success. Many BBC groups are defining special standards for electronic platforms, which are used to keep the digital content in different platforms in the same style and, moreover, to make this digital content searchable (BBC, 2002). Metadata-relevant technology is essential, as the most common method to search for videos and audio today is text input. Rosenfeld (2006) proposed that metadata, as a technology, is also a part of broadcast media production workflows.

Mariátegui (2013) claimed that digitalization is probably the most important and impressive development in broadcast media in recent decades. It has made data and metadata able to be searched and retrieved effectively, confirming that digitalization greatly helps the efficient management of digital assets. Metadata allows users who have search skills to operate digital contents (Grainge, 2011). For DAM staff, the preservation of metadata ensures a long-term description and a sound control of digital assets. It describes the structure and method of data in the database. Videotapes and other video recorder hardware have been replaced by digital video formats, which are operated through the database where all media content is concentrated. Broadcast media is contained by the logic of computer programming (Manovich 2001), thus metadata is vital in broadcast media. According to Mariátegui (2013), the digital assets in broadcast media are formatted to a specific standard and are stored in a database that involves two major requirements for access. First, digital assets such as video or audio must be searched in the digital repository. Second, the integration of processes is a premise for protecting broadcast digital assets through a unified digital workflow. Lovink (2008) claimed that because of the digitalization of the media industry, audiences watch the database instead of watching TV or movies. In this sense, the management of databases should be considered

by broadcast media.

For the first 50 years of the television industry, the ingest of data was simple. The broadcaster always wrote all the information (the metadata) of a programme on an index card and stored it on a shelf (the database). During the shooting process, the production assistant recorded details on a tape box or movie cans. With the development of technology, this method of archiving was changed, but metadata is always the key element of an archive. Fifteen years ago, one of the world's largest broadcasters spent millions of dollars to implement a computer archive system that represented its card index. The explosions of digitalization and distribution channels have been proven to be the promotion of change (Darlow, 2007). Nowadays, broadcast content is not stored in tapes on the shelf, but is stored in files in computer archives, where audiences are required to access digital content several times simultaneously. For example, BBC has one of the largest multimedia archives in the world, which houses numerous digital assets and on which many programmers have been dependent for decades. They can allow customers and viewers to use the digital contents in the archive at any time and any place. Archives require DAM to ensure the safe storage and access of digital assets for the purposes of research, reuse, and heritage, while regularly transferring to up-to-date formats. Therefore, in this sense, technology is an important element to make the archives accessible, versatile, scalable, and efficient.

### 3.3 Transmission and Distribution

Digital technology promotes the expansion of digital content and platforms and business models for transmission and distribution of digital content are also establishing due to the dynamics of the internet (Kim, 2012). After digital assets in broadcast media are digitized and indexed, they will be delivered. The process of transmission and distribution makes digital assets accessible in different platforms and on different devices and allows comprehension of the ways content is consumed by audiences. Kallinikos and Mariátegui (2011) indicated that digital assets must have a specific format when broadcast to make their management flexible and interoperable; therefore, one of the keys to successful management of digital assets in broadcast media is the conversion of digital content to ensure it is transformed to proper format for distribution. Kalkanis (2010) states that, "it is these clever technologies that allow us to deliver video over a busy internet". The BBC delivers programmes mainly through four devices: PC, television, mobile and tablet. Different devices need to be taken into account when distributing broadcast content, as different devices have different capabilities and resolutions. The format of video depends on the player, as well

as the data speed; therefore, it is necessary to compress the digital assets to different formats to meet the different platforms and bandwidths. Cubitt (2008) proposed that compressing video content usually reduces the original quality. Therefore, compressing technology is vital in broadcast media so that high quality versions of assets (usually not compressed) will be returned to the archive. As CNN News reflected, recent internet technology innovations cannot meet the needs of high bandwidth broadcast distribution; they should deliver a large amount of live content streams to a wide range of audiences at the same time. Chawathe (2003) proposed that there are many interesting applications, including real-time broadcast video streams for concerts or sports and other capable and dependable distribution software. He identified three basic demands for scalable broadcast services, the most important being efficient infrastructure for large-scale broadcast distribution, as many of the current solutions, for instance, network layer IP multicast methods and a range of distributed systems, cannot address all of these problems efficiently. Therefore, an efficient broadcast distribution framework is really important for the broadcast industry. The Scattercast architecture, which is for internet broadcasting, can solve distribution problems. The architecture uses the application layer to intelligently build a broadcast overlap network, rather than a regular network layer approach. The Scattercast can be implemented in broadcast media to increase the efficiency and flexible of distribution, which can help the following DAMM steps. Although some technology problems exist in broadcast media, those problems can be solved with the development of technology.

When DAM staff deal with problems in broadcast media, they should cogitate the technology factor and know that in real broadcast media, content production and distribution are separated. For instance, the BBC's content production is usually, partially or wholly, commissioned by a third party or by a department within an organization with creative and production expertise. Because of the various transmission and distribution platforms, many traditional processes are rapidly changing. Firstly, metadata associated with creating new content becomes the key to its distribution and search-ability. Therefore, arranging the right metadata and adapting it to each distribution platform is vital. Secondly, video-on-demand is becoming more and more popular, which is different from TV scheduling because the content is defined by personalized, unceasing, changing user experience and audience data analysis. Kallinikos and Mariátegui (2011) claimed that video distribution and production processes are related and that the internal operations of the BBC are acting in collusion with

internet technology, including strategies and consumer habits, which need to be considered when managing digital assets in broadcast media.

#### **4. Other Important Factors in the DAM in the Broadcast Media**

##### **4.1 Strategy**

Although technology updates help to drive the success of DAM, strategy is also essential for an organization. Teece (2010) points out that technological innovations cannot guarantee the success of a business, and strategies associated with market and value are crucial. Digital assets might offer opportunities for the business model of an organization, such as the success of Google, Amazon, and Netflix; however, they may also threaten the business model of a company, such as the failure of Kodak, Borders, and Blockbuster. Mithas and Lucas (2010) state that the investment in IT resources exceeds 3 trillion dollars a year and that even one organization can invest more than one billion dollars per year. The Return on Investment (ROI) in technology in broadcast media should be considered and organizations should know how they can use technology as a strategic asset to make new capabilities and keep a competitive advantage. In this sense, strategy is indeed important.

According to Tanner (2017), strategy is "a plan of action aimed at achieving long-term or overall goals", such as "where are we going and why?" Freedman (2013) claims that strategy is about keeping a balance between the ends and the means and about determining the goals and the resources and methods that can be used to achieve them. Strategy can help organizations to be successful because the adaptation of new technology is a long process. Therefore, strategy is an important factor when DAM is implemented in broadcast media. Johnson, Scholes and Whittington (2008) offered that the strategy of an organization is usually about its long term direction, its market or scope, its advantages over competitive organizations, the resources that can be used to compete, the external factors which can affect the businesses' ability to compete (environment), and the stakeholders. Wager (2005) proposed that it is vital for an organization to realize their true strategy at first. Data on strategy management shows that only 9% of organizations believe they have the ability to fully deploy their strategy, 45% of organizations believe that their implementation of strategies is effective, and 90% of well-designed strategies fail due to poor performance. The mismanagement of organizations and the spending of excess time and money are common, and can lead to failure of achieving goals, as in the case of the DMI. Consequently, the DAM strategy should be well

structured and executed to ensure the success of broadcast media.

The business model of Netflix is to provide video entertainment over the Internet. Nevertheless, it requires having the rights of videos to distribute them through different platforms and therefore, Netflix needs to negotiate with movie firms and television websites. They also need to transform videos to the television set through the internet. The DAM strategy of Netflix is to create an efficient system, based on IT, to distribute physical DVDs through the mail. The long-term strategy is to work with Roku and consumer electronics manufacturers to enable the direct download of videos to PCs and televisions via the internet (Mithas & Lucas, 2010). Because of its DAM strategy, Netflix is more flexible on the distribution and ingest of digital assets and can face future changes; about 60% of customers have been experimenting with video streaming through the internet. Therefore, strategy can help the success of DAM in broadcast media.

##### **4.2 Audience**

Although technology is doing a lot in DAM, it is more important to understand the needs, and associated reasons, of audiences for technology. No matter how advanced the technology, if there is no cooperation with and approval by audiences, the technology will be wasted (Daines, 2005); the success of DAM in broadcast media is more strongly related to the acceptance of audiences than technological changes. Kallinikos and Mariátegui (2011) investigated the BBC's video production and distribution processes and found that digital technology innovations are interrelated with the accessibility and ways of consumption. Therefore, in addition to technological factors, consumers are also important in broadcast media. DAM services broadcast media, which is an audience-based tool. Audiences can define the market and can let managers and broadcasters know the potential and value of their digital assets. Most broadcast organizations will investigate the data on audience behaviour, such as the duration and type, of watching, which are changing all the time. Broadcast media usually communicate with their potential audience and tell them what to expect. According to Flashman (2017), programmes and contents have their own social life nowadays; people can interact with programmes through various platforms such as YouTube and Facebook and can vote through social media based on their preferences, which produces digital assets. At this time, the DAM managers should track these digital assets and use them. For example, the show, House of Cards, is commissioned by Netflix based on metadata. Friedland (2013) states that Netflix pays more attention to audiences so that they can have a direct relationship with them, can

learn the requirements of their target audience, can predict their digital contents, and can understand audiences' sentiments in real time. The success of Netflix shows that, although technology is vital to the success of DAM, the audience factor is more essential.

It is vital to encourage audiences to contribute to the digital content production, which can be called crowd-sourcing, as digital assets are very useful to archives. A well-known example is the University of Oxford's Great War Archive, which carried out a project in 2008 to encourage the public to contribute photos, stories, and items owned during the First World War. The result was impressive, as the archive collected over 6,500 unpublished photos, items, and interviews from the public. The digital assets are used by many broadcasting organizations such as BBC.

### 4.3 Other Important Factors

In addition to technology, strategy and audience, there are many other factors that are also important for DAMM in the broadcast media such as lifecycle, commission, business processes, information and many technical expertise and business expertise. All of these factors are essential for successful DAM in broadcast media.

## 5. Conclusion

In conclusion, this essay discussed the factors involved in the successful management of digital assets in broadcast media in three aspects: technology, strategy, and audience. Although technology plays an important role in the successful management of digital assets in terms of workflow, metadata, archiving, transmission, and distribution, other factors are also crucial for DAM in broadcast media. Strategy associated with market analyses can help the success of a company's DAM. Audiences' needs and the reasons for them can provide broadcast organizations with new, valuable, digital assets and help them to attract potential audiences. Therefore, these three factors are all significant for efficient DAM in broadcast media. In addition, there are also many other vital factors, DAM managers should consider all of those factors when they want to successfully manage digital assets. In the future, DAM will become more and more important to researchers as a way to deal with problems in various domains, as there may be more advanced technologies, new strategies, and new ways to engage with audiences.

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