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**Article** in International Journal of Academic Research in Business and Social Sciences · October 2018

DOI: 10.6007/IJARBS/v8-i9/4652

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v8-i9/4652>

DOI: 10.6007/IJARBSS/v8-i9/4652

**Received:** 16 August 2018, **Revised:** 21 Sept 2018, **Accepted:** 29 Sept 2018

**Published Online:** 19 October 2018

**In-Text Citation:** (Kiplie, Yatin, Angutim, & Hamid, 2018)

**To Cite this Article:** Kiplie, F. H., Yatin, S. F. M., Angutim, M., & Hamid, N. H. A. (2018). System Development for Document Management System. *International Journal of Academic Research in Business and Social Sciences*, 8(9), 748–757.

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**Vol. 8, No. 9, September 2018, Pg. 748 - 757**

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## System Development for Document Management System

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### ABSTRACT

Digitization systems should always support the sharing of views or movement of data from other systems, regardless of the level of integration selected. System development is a formal set of process to define, design, testing and implementing a new software application or program. This includes the process of internal development in order to customize the systems, and creating the database system as well. Digitization system offers to organization in capturing important materials that can be treat as an important information and knowledge for users either for business, study, or research purposes. This is because digitization system has the ability to store manual information (tangible format such as books, letters, picture, etc.) into electronic format. The objective of system development is to accessibility, preservation of materials, meet customer and get expectation. To ensure have a good system development we need to follow six step which is planning, system analysis, system design, system development, system testing and integration and system maintenance. In order to develop a good and success system, it required to choose suitable software in ensuring that the user can use or browse through the system and view the document in the database. There is some possible vagueness or misperception when describing information system and digitization system definitions or concepts or methods.

**Keywords:** Information System, Digitization System, Document Management System, System Development.

### INTRODUCTION

Seadle, (2011) argues that none of the information professionals (IP) had a clear idea of what metrics should apply to make it possible to compare the effectiveness of one digitization system with another. But they generally agreed that the digital archiving community needs to develop measurement to enable a fair and open comparison and to make it possible for IA (Information Agencies) and other cultural heritage institutions to make rational choices for long-term digital preservation. It is important to know that an archive is capable of migrating data in format A to format B, it would be equally useful to know what rules or measures of availability triggered the migration,

how often the need for migration was tested, and how long it took after the trigger event to implement the migration. This migration need also to consider the system development.

System development is a formal set of process to define, design, testing and implementing a new software application or program. This includes the process of internal development in order to customize the systems, and creating the database system as well. The system designed to capture, store, retrieve, display, process and communicate or disseminate the documents for aimed users. Zandbergen (2017) stated that to develop a good and success system, it required to choose suitable software in ensuring that the user can use or browse through the system and view the document in the database. There is some possible vagueness or misperception when describing information system and digitization system definitions or concepts or methods.

### ***Information system***

Information system is an organized system of information that functions it collect, organized, store, and communicate the information. Specifically, information system is a group of connected people and organization to collect, filter received information or data, process, create and distribute the data to specific users. So, information system can be concluded as a group of components that interact together to create, produce and disseminate information (Kroenke, 2015).

### ***Digitization System***

Digitization, less commonly digitalization is the process of converting information into a digital (i.e. computer-readable) format, in which the information is organized into bits. The result is the representation of an object, image, sound, document or signal (usually an analogue signal) by generating a series of numbers that describe a discrete set of its points or samples. The result is called digital representation or, more specifically, a digital image, for the object, and digital form, for the signal. In modern practice, the digitized data is in the form of binary numbers, which facilitate computer processing and other operations, but, strictly speaking, digitizing simply means the conversion of analogue source material into a numerical format; the decimal or any other number system that can be used instead. Digitization is of crucial importance to data processing, storage and transmission, because it 'allows information of all kinds in all formats to be carried with the same efficiency and also intermingled'. Unlike analogue data, which typically suffers some loss of quality each time it is copied or transmitted, digital data can, in theory, be propagated indefinitely with absolutely no degradation. This is why it is a favoured way of preserving information for many organisations around the world (McQuail, 2000).

### ***Document Management System (DMS)***

A document management system (DMS) is a system (based on computer programs in the case of the management of digital documents) used to track, manage and store documents and reduces paper. DMS is a computer program that functions to manage digital document. The included feature in DMS is tracking, managing, and storing documents. The advantage of using DMS for organization is enable them to keep and created various types of document, and DMS offers different users to modified records. Other than that, DMS also related and consist of enterprise content management

components, such as asset management, document imaging activity, workflow system and records management system activities.

## **OBJECTIVES OF DIGITIZATION SYSTEM DEVELOPMENT**

### ***Accessibility***

Basically, the main reason for developing system for digitization is to improve the specific information accessibility because some materials cannot be accessed due to the potential users that are unaware of its existence and how to find it. Some of its store or held in an institution that are far away for the users to get access especially for users who lived in rural area. By collecting and storing it together in a system, it will increase the public accessibility towards the information because as long as the users connected to the Internet, distance and travel is no barrier to accessing online collections.

### ***Preservation of materials***

System that digitizes the paper form original materials into electronic offers excellent opportunity to handle conservation and preservation of the information. Many old important records, manuscripts and information materials are getting fragile especially paper form or photograph material because of the chemical used in it has changed and required to be transfer in electronic form so that the important information will be preserve and maintain as well.

### ***Meet customer expectation***

Developing a digitization system requires the developer to know who are the primary user, why they will use the designed program or site, and the context and navigations style in which they adapt for. The users might be students, educator, researchers, businessman, or children. Each of these users has different skill of searching information via online. The digitization system design may create separate access pages for each of users or create one design for primary users only. The created system navigations have to be easy but aesthetic to let them find what they need to fulfil their purpose for visiting designed system in the first place. Complex navigations help users to fast retrieve and find the information they want. This is also will lead to frequent access from users as well.

### ***Instant global distribution of information***

System development created are mainly for swift transfer of information, knowledge and data to users around the world. In which other region or country can introduce and share information regarding to their culture, knowledge, history to other country by made it online accessible. Besides, any other knowledge or resources of collection keep by an organization can be share and transfer to other organization by online sharing especially for educational institution around the world. They can share or exchange the information and collection of research to other universities, so they can enlarge their collection via online and this can help their user or student can access collection from other institution for their study or research purposes.

## **FUNCTIONS OF DIGITIZATION SYSTEM**

### **Capture and store information**

Digitization system offers to organization in capturing important materials that can be treat as an important information and knowledge for users either for business, study, or research purposes. This is because digitization system has the ability to store manual information (tangible format such as books, letters, picture, etc.) into electronic format. In electronic format, organization can maintain and protect the authenticity of the original information through scan, imaging, display image, convert the information into electronic text where all can be download and display electronically. Digitization system can benefit the organization in terms of storage because it can offer a lot of space for electronic storage for their collections of information (Anderson and Maxwell, 2004).

### **Access and Display Information**

Digitization system offers easy access and display not only for the owner but also for targeted users or reader of the information. The digitization system was built purposely to help user able to gain information regarding to the specific collection, to let the users know that the collections are access through online and can be kept in electronic format as well. This is because, keeping the information manually in the building are not only hard for user to find and access but this also can cause the materials fall into oblivion or as 'treasure' and future generation not aware of the existence of the material or information (Anderson and Maxwell, 2004).

### **Process and communicate the information**

Digitization system also offers the organization to process and communicate the digitize information to the users. The organization can process necessary information to let the community or users know the importance of the information. The existence of the material can be promoted to the users by communicate it online. Other than that, system can enable the organization to communicate with user about services, collections, and navigations on how to finds the information needed (Anderson and Maxwell, 2004).

## **PHASES OF THE SYSTEM DEVELOPMENT LIFE CYCLE**

Rouse (2009), explains that the System Development Life Cycle is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. System Development Life Cycle is important in the selection of an information system because it results in some high-quality systems that meets or exceeds customer expectations. Moreover, System Development Life Cycle models play significant roles when emerging compound systems that require large teams of engineers, specialists, computer programmer and testers. There are six phases of System Development Life Cycle.

### ***Planning***

Planning is the most important step or phases to create successful system. Need to decide exactly what to do and the problems to solve. Need to define the problems, the objectives and the resources such as personnel, costs, resources and so on. Also need to study the ability of recommending

alternatives solutions after meeting with clients, suppliers, consultants and employees. After done analysing all this data, there are three adoptions which is progress new system, improve the current system or leave the system as it is. So, that is why planning is an important phase.

### ***System Analysis***

The end user requirement should be determined and documented what actually their expectations are for the systems, and how it will perform. Then, the instigation and feasibility study will be made for the project as well which involves defining whether it is administratively, economically, socially, technically achievable. In addition, it is vital to maintain robust communication level with the clients to make sure that they have the clear vision of the finished product and its function.

### ***System Design***

The design phase comes later a good considerate of customers' requirement. This phase also explains the fundamentals of the systems, the components, the safety level, modules, architecture and the different borders and type of data that goes through the system. For example, a universal system strategy may be finished with a pen and a piece of paper to regulate how the system will look like and how it will practical, and a detailed and lingering system design is formed, logically and physically and the last one whether it will meet all practical and practical requirements, reasonably and physically. So, design is important phases that must be done.

### ***System Development***

This phase come afterwards a whole considerate of system requirements and conditions, it is the actual construction process after having a whole and shown project for the requested system. The system is complete to be organized and then installed in customer buildings, ready to develop successively, live and productive. Training may be essential for end users to make sure that they recognize in what way to practice the system and to get aware with it. Then, the operation phase may take a long time and that depends on the complexity of the system and the solution it presents.

### ***System Testing and Integration***

Testing is attractive more and additional vital to warrant customers satisfaction, and it involves knowledge in coding, hardware arrangement or design. Testing also may be performed by real users, or by team of specialized peoples, it can also be efficient and automated to certify that the real outcomes are related and equal to the projected and wanted outcomes.

### ***System Maintenance***

Intermittent preservation for the system may be accepted out to ensure that the system will not develop obsolete beforehand; this also will include changing the old hardware and incessantly evaluating system performance. It also includes providing latest informs for convinced components to make sure it encounters the right standard and the newest technologies to face current security threats.



## FEATURES FOR DIGITIZATION SYSTEM

LOCKSS.org. (2017), determines several features in digitization system, which is:

### ***Preservation***

The software need constantly monitors the content by cooperating over the internet to compare each copies of the same content. This is to ensure the content of each digital preservation materials is being properly preserved.

### ***Ingestion***

The target content's URL structure, file formats and delivery mechanisms can be analysed by the program. To serve readers, publishers and IP, they need to design a content-specific preservation action plan.

### ***Access Delivery***

For readers to access the content preserved, they can access by serving (acting like a web server), by serving through integration with an Open URL resolver or by proxying (i.e. acting like a web cache).

### ***Management***

Through a web browser, IP can operate their institution's that allow them to easily choose new content for preservation, supervise content's preservation status and a variety of other functions.

### ***Format Migration***

The system can transfer the content to a newer format for display when a reader's web browser cannot display the content. In other words, when a format become obsolete. This method, called "migration on access," advantages the capabilities built into HTTP. The system can convert the original format to a format that the browser can display (a temporary access copy) when a reader wants to view a preserved content and that reader's browser cannot display the content in its original format and delivers the content to the reader. It is known as "on the fly" migration.

### ***Compatibility***

The ability of one computer or a piece of software to work with one and another. If it is a *software*, it must be capable of being run on another computer without change. Software is the key element in successfully creating system for storing and displaying information. The right software not only determines how to create the interface of the system. When purchasing software, find a product that perform well and offers less expensive upgrades when newer version is available. Upgrading and staying with a product can save time and valuable resources in the future, so look at long term when shopping for and purchasing software.

If it is a *hardware*, it must be capable of being connected to another device without the use of special equipment or software. When developing a system, hardware is the equipment that the system cannot live without. Acquiring the right hardware is one of the most important tasks in building success system. First and foremost, which computer platforms the system will be use either PC



running Windows or Macintosh as an operating system. However, purchasing quality product that are also cost effective are the most recommended because the system also need further maintenance which acquire much cost.

Some examples of compatibility such as Standalone servers, Virtual server, Runs on Linux OS etc. The system can preserve all web published formats (animations, datasets, moving images, still images, software, sound, text) and genres (journals, books, blogs, websites, scanned files, audio, video).

### ***Limitation***

The model for digital subscriptions does not allow the IA to retain a copy of the journal. If the publisher's website is down for the day, the content that has been paid for is no longer available. The software is format-agnostic and preserves all content in its original format, as delivered from the publisher, including the format metadata that enables a browser to render the content.

## **SUCCESS STORY AND FAILURE OF SYSTEM**

### **SUCCESS**

#### ***Workflow***

Developing system involves several steps and many different files types are created in the process. It is easy to lose track of progress if do not have some kind of record of particular progress. One of the famous ways to keep in track the work progress is framework such as Gantt chart.

#### ***Collaborate***

Developing system acquire huge amount of money. Consideration of making money aside, working with others may be reduce some cost and give wonderful result. By collaborating with others, it can reduce the considerable cost of equipment, personnel, maintenance, and software. Anderson and Maxwell (2004) suggest that there are some ways to collaborate with other such as *consultancy* (your institution contracts with an expert in the field of digitization), *outsourcing* (hiring an outside organization-either a vendor specializing in digitization), *digital consortium* (a number of institution of various sizes and types to form a digital consortium) and *joint project* (two institutions share the labour/cost of a digitization project). Joint project approach is common when the institution involved each hold portions of a major collection. By working together, it can reunite the collection of information in online. For example, the fine arts collection can combine with the photography's collection. In this case, it is very important to cover ownership of the materials first in agreement. One partner can contribute materials and funds while the other partner responsible in digitizing, design system, and responsible to make the materials online and accessible for user. However, the way to collaborate is still depends on the needs, financial, and goals of the organization.

#### ***Staff training***

Training is an important part of developing skill and knowledge among staff. They need to know which format to use for the project, and they should familiar with the software programs being perform in the system.

### ***Testing***

Testing is a procedures or process that implemented to ensure the system able to establish quality in performance. This is means that, all digital preservation need to be tested in some degree before implemented the designed system. This is very important to be done as to ensure the system help organization to reduce malfunctions and error during using the system in the future so that the system able to meet the needs and expectation of organization as well.

### **FAILURE**

Lyytinen and Hirschheim (1987) mention despite cases of successful information development projects, it is widely accepted in the field that an unacceptable number of projects fail. Various estimates show persistently that half of all system failed. Based on article 'Outlining organizational failure in information systems development' by Goulielmos (2003), one of the very first studies examine following concepts of information system development failures that found in the empirical literature was:

#### ***Correspondence failure***

Correspondence failure is when the information system that have been created did not meet the actual design objectives according to the users or organizations needs. Means that, when the correspondence is failed, it can cause the system cannot fulfil the specific feature in organization daily working transaction. So, when the developmental or operational activities are incomplete it can cause low quality in the organization's productivity. At the same time, it can cause to dissatisfaction of organization towards the features and design of the system.

#### ***Interaction Failure***

Interaction failure occurred between users and information system have non-interactions or low interaction in between where the users has no idea what is the system means or functions to them, and how to use the system to solve their needs in order to find information for study purposes, work purposes, or even for research purposes. This is caused by, lack of advertising skills

#### ***Process failure***

The process failure happens when system overruns its budget or time constrains during the implementation of the system. Overruns budget happen when there is no well financial management in purchasing equipment, and other materials. While at the same time, any delayed task caused by any problem during the process will caused the sequence of entire project will be delayed as well.

#### ***Expectation failure***

Stake holder is a person or organization with an interest or concern in the project or system. This means that the stakeholder is the one who determining what constitute the success or failure of the system development. The system does not meet stakeholder's expectation when the model, design, and how the system working doesn't like what they want. So, it is very important to updates the implementation progress of the system to them.

## CONCLUSION

Digitization systems should always support the sharing of views or movement of data from other systems, regardless of the level of integration selected. To ensure that records, archives or manuscripts are identified, captured and retained, the information professionals (archivist, conservators and academics) have been struggling in promoting the best practice for creation of conceptual models and frameworks in digitization system. Testing all software packages, investigate vendor's background are among the steps in ensuring a good system been development or purchase.

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