# Strategic Data Digitization: Concatenation of Information Management Success in State-Owned Tertiary Institutions

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## Abstract

The study investigated the relationship between data digitization and information management success of State-owned Tertiary Institutions in Rivers State. The study dimension was digital backup while effective knowledge-base and quality decision-making measured the dependent variable. The research provided answers two questions and tested two hypotheses in order to establish the hypotheses formulation that there is no significant relationship between data digitization and information management success. The study population comprised of four State-owned Tertiary Institutions in Rivers State. The research selected administrative staff members from each of the institutions under study making it a total fifty study elements. Data were generated from the respondents by the use of a well-structured questionnaire. Pearson's product moment correlation was used to test hypotheses with the aid of statistical packages for social science (SPSS) version 23.0. The p-values were calculated to determine the significance of the hypothesized relationship. Analytical outcomes revealed statistically positive and significant relationships between the dimensions of our predictor variable-data digitization and the measures of the criterion variable-information management success. Based on the findings, the study concluded that data digitization has a positive significant relationship with information management success of State-owned Tertiary Institutions in Rivers State. The study further recommended amongst others, that Administrators of State-owned Tertiary Institutions should capitalize on the pivot role of Digital Backup in their operations to ensure their Information management success.

***Keywords:*** digitization, information management, information management success, DD, IMS

## Introduction

In the existing literature, many researchers use digital innovation and digital transformation to mean the same thing, but these two terms are not necessarily the same. While digital innovation refers to the creation and use of appropriate technologies to digitally support all aspects of an organization's operations (Demirkan, Spohrer, & Welser, 2016), digital transformation enables the integration of various digital transformations, leading to changes in standards and practices; values and beliefs that change or complement existing business processes in an organization (Hinings et al., 2018; Solis & Littleton, 2017). This shows that digital transformation goes beyond digital innovation and includes complete digitalization of processes and digitization of the working environment. Although these two terms are mostly used in the private sector (Markovitch & Willmott, 2014), they also affect public organizations that respond to social and public issues using one or more public tenders (Bharadwaj, Sawy, Pavlou, & Venkatraman, 2013). In Japan, for example, digital transformation even aims to impact all aspects of life through the country's Society 5.0 initiative, going far beyond the limited Industry 4.0 vision of other countries (I-Scoop 2017). Digitalization has two very similar terms and is often used interchangeably in many contexts. Google Scholar found approximately 571,000 results for "digitization" and approximately 221,000

results for "digitalization"; this shows the full meaning. The concept of digitalization is recognized. The first term refers to digitization as a process of digitalization, that is, the conversion of analog data (photos, videos, texts, etc.) into digital form (The Oxford English Dictionary 2019; Gartner 2019a). Brenen and Kreiss (2016) also define digitization as the basic process of converting analog data stream into digital material. The second definition is that digitalization is the adoption or increased use of technology by an organization, business or country (Oxford English Dictionary, 2019). Technology has advanced many processes in today's business world. Fundamental to these advances is the digitalization of the organization's data, information, and content management. This is the superficial basis of our research. In this study, digitization of data is defined as the process of converting data from analog format to digital format using technology.

Digitization means creating a computer representation of a printed simulation. There are many ways to digitize and there are many types of media that can be digitized. But the most important are text and images because they are important components of the digitization process. Therefore, it is about converting original products into other formats. Technically, the digitization process involves converting analog images into corresponding numerical values (Morrison et al., unconfirmed). Digitization is derived as an aspect of digitalization. Digitization refers to the technological process of embedding digital artifacts into technological objects (Pfeiffer & Jarke 2017). At a fundamental level, digitization can also be understood as the creation of digital versions of physical objects such as paper documents, microfilm images, photographs, and audio (Abu-Shehab, & Khairallah, 2015). In other words, digitization is a concept that describes the process of converting paper documents into digital format for storage or use in IS. This world is called the information age, and technology is playing an important role in helping organizations create new ways to manage their content and operations. To cope with the pace of technological change the world is facing, business organizations are using information technologies to update and change business routines (Bianco & Covino, 2018), which has given rise to concepts such as transformation and digital innovation. Digital transformation has been studied since the 1960s, when the concept first emerged (Schwertner, 2017). According to I-Scoop (2017), digital transformation is "a major change in business and operations, processes, capabilities and structures that takes full advantage of the transformation and opportunities in technology and its rapid impact on offering and advancement, including current and future changes". Considering the business world, one of the main reasons for this change is to provide competitive advantage to the business and control their content, process and performance (Hinings, Gegenhuber & Greenwood, 2018).

Brenen and Kreiss (2016) argue that the process of digital transformation is the change of many areas of social life around digital communication and social media. A simple example can also explain the difference in meaning. As part of our digitization process, we use digital equipment to scan simulated contracts to create digital contract documents, which we store in digital PDF format and store on your computer's hard drive. As part of digitization, we use digital tools to scan analogue contract documents into digital contracts and save them in digital PDF format. The PDF is uploaded to the cloud service on the Internet and can be accessed anytime and anywhere. In both cases, the process becomes digital, but in the second case the possibility of digitalization is used more and therefore the process also becomes digital. Although digitalization has indirectly positive connotations, digitalization is often not the case. This example also shows that digitization is an urgent need to achieve digitalization (Gorenšek & Kohont, 2018).

Therefore, digitization is the process of converting an analog data stream into a digital product that has no consistency and value or follows two independent states (Feldman 1997). These two independent situations are characteristic of the digital world and lead us to conclude

that digital information is "discrete and pure", while analog information is "continuous and noisy", as Pepperell (2003) puts it. However, Robinson (2008) interprets his analogy in more detail, saying that analogies are different, they are not true, and that there are tools that clarify this without interfering with time and space. He likens the metaphor to space and time, allowing and affecting infinite division (space and time), real and natural; combines objects with the precision of artificial and arbitrarily cut numbers, presented in different shapes and different sizes through different types of products. From a theoretical perspective, almost any device with two simple states can be used to store and transmit digital signals, including silicon transistors, punch cards, or atoms (Brennen & Kreiss 2016).

Manoff (2006) talks about the ineffectiveness of the information obtained through digitalization while reducing the importance of the body (transistors) that stores the information. In this context, the main findings of the authors (Manoff 2006; Hayles 2003) are that digital information is stored in transistors in the form of objects in the physical aspect of the device and communicated through them. Although digital data is not limited to specific devices, it ultimately relies on devices. This is exactly how digitalization works between tangible and intangible things, making digitalization a unique process. Verhulst (2002) also suggested that just as digitized information can be represented on any transistor cluster, any type of information (alphanumeric text, images, still and moving images, and sound) can also be digitized. Van Dijk (2006) states that the conversion process results from specific information process and require a special process to reproduce the original signal itself. Although popular opinion defines digitalization mostly as a technological process, we humans have already made some choices about what to keep and what to discard in the algorithms that complete the digitalization process. Sterne (2003) points out that the same applies to analog technology in the historical example of sound production. For the first time, analog techniques create more honest images than digital images, which continue to improve things immediately, but both need to describe the world. Therefore, digitalization creates information through a specific process, or as Negroponte (1995) points out, it is a digitalized world of information. Additionally, Flew, (2005) argued that a bit can be associated with another bit, regardless of how it is converted into numbers or numbers represented when presented to end users. Since there is a lot of evidence in the documents regarding the activities carried out by universities, the management of documents is also considered an important factor in protecting their preferences.

Data digitization strategies ensure that universities can manage their data as reliable evidence at any time when they need to prove their actions or defend their work. This will become an important benefit as we move to a belligerent society. State-owned Tertiary Institutions are also under increasing pressure to demonstrate their role and status in archive management. This may take the form of internal audits, referrals to financial institutions, or public oversight through legislation. In all cases, repositories face problems; these organizations, which cannot protect their data from fire, flood and unauthorized users, may face serious problems such as losing their key points, making it easier to protect their public image when needed. Other researchers have tried to use different methods to address Information Management Success (IMS) issues, but this study uses data digitization techniques as an indicator to address Information Management Success (IMS) related issues in universities in Rivers State; We believe that IMS' adoption of the findings of this study by organizations will provide them with good savings that they can take to overcome the decline in their buildings. Based on this backdrop, this study sought to investigate the relationship between Data digitization strategies and information management success of State-owned Tertiary Institutions in Rivers State, Nigeria.

**Objectives of the Study**

The general purpose of this study is to investigate the relationship between data digitization and information management success of State-owned Tertiary Institutions in Rivers State. Specifically, this study attempted to ascertain the following objectives;

**i.)** To examine the relationship between Digital backup and Information management success of State-owned Tertiary Institutions in Rivers State.

**ii.)** To investigate the relationship between Information Backup and Information management success of State-owned Tertiary Institutions in Rivers State.

**Research Questions**

The following questions were raised to address the objectives of the study.

i.) To what extent is the relationship between Digital backup and Information management success of State-owned Tertiary Institutions in Rivers State?

**Research Hypotheses**

The following hypotheses were tested for confirmation or rejection.

**$H_{01}$:** There is no significant relationship between digital backup and effective knowledge-base of State-owned Tertiary Institutions in Rivers State

**$H_{02}$:** There is no significant relationship between digital backup and quality decision-making of State-owned Tertiary Institutions in Rivers State

**Review of Related Literature**

**Information Management Success**

In an increasingly technological world, information systems (IS) provide support at multiple business levels, from operational transactions to strategic initiatives. On the other hand, the success of IS information is fundamental for organizations (Varajão, 2018a). Assessing success can be a major task, as the complexity of information requires consideration of many variables of a technical, behavioral and contextual nature (Morcov, *et al.*, 2020). The evaluation of information success has long been a subject of research (Aragonés-Beltrán, *et al.*, 2017; Liang *et al.*, 2017; Osei-Kyei & Chan, 2018). Some studies suggest that success is evaluated throughout the information lifecycle (Teixeira *et al.*, 2019; Varajão, 2016), but also with ex-post information (Karlsen *et al.*, 2005; Varajão, 2018a; Varajão & Trigo, 2016). Additionally, as success metrics are specific to each piece of information (Albert *et al.*, 2017), it is fundamental to define a process for managing success (focused on understanding, evaluating, and reporting success) (Varajão, 2018b).

Success has multiple meanings depending on the perspective and the people involved. Freeman and Beer (1992) state that success means different things to different people; “Success for an architect is in terms of aesthetic appearance, success for an engineer in terms of technical ability, and success for an accountant in terms of the amount of money spent on a building”. For example, a human resources manager The CEO may measure success based on market share. The concept of success should be broad and include the perceptions of all stakeholders (Wateridge, 1998). Stakeholders include customers, developers, information teams, or end users (Shenhar *et al.*, 2001). Regarding information success, there are two perspectives to highlight (Shenhar *et al.*, 2001, 1997). One perspective is that all business goals can be achieved even if information management does not yet meet schedule, budget, and quality. Another perspective is that information management may be successful in terms of scope, quality, budget, etc., but the

information does not meet customer expectations. To further our understanding of success, it is important to distinguish between factors and criteria for success. Westerveld (2003) explains this difference by stating that successful information management requires a focus on the results area (in terms of information success criteria) and the organizational area (in terms of success factors). Success factors relate to circumstances, facts, and influences (Lim & Mohamed, 1999). Success criteria are dependence structures for determining whether information is successful or not (Turner, 2014). Examples of success criteria include customer and information team satisfaction, cost, time, and scope compliance (Osei-Kyei *et al.*, 2017). Success factors include experience as an information manager, ability to work in a team, and support from top management (Gunduz & Almuajebh, 2020).

**Digital Backup**

According to Adiele and Obara (2022), backups are performed to prevent data loss. Data loss can occur as a result of disaster, hardware failure, software failure, or user error. Disasters include on-site flooding or fire that destroys the media on which data is stored. A common hardware failure is hard drive failure. Software errors can include errors caused by software updates that inadvertently change or delete data before you are aware of the error. User errors include accidentally changing or deleting important data. Backup utilities take as input the data to be backed up and produce redundant data as output. This redundant data can be used to reproduce the original input data. This redundant data may be simply a copy of the original data, or it may be more complex. The purpose of creating this redundant data is to restore the original data in case of data loss, so redundant data is typically stored on a separate storage medium and sometimes in a separate physical location. It will be saved. In this way, the cause of loss of the original data is less likely to be the cause of loss of redundant data. Digital backup is the process of making multiple copies of specific pieces of data and moving those data to different locations on your computer.

Digital backup is the process of replicating data and restoring a replica set after data loss. There are currently various types of data backup services that can help businesses and organizations keep their data safe and ensure that critical information is not lost, even in the event of natural disasters, theft, or other emergencies (Justine, 1998). The purpose of digital backup is to prevent data loss in the event of a computer failure, from physical damage to internal errors. The risk of data loss has been a concern since the dawn of data recording, and this is especially true in the digital age. Digital information has an advantage over older analog forms of data storage in that it is much easier to copy. This will allow you to perform a backup of your data. Redundant information can be recorded separately and later used to restore the original information if it becomes corrupted or lost. Although the concept of backup is easy to define, many users still do not have an easy and effective way to back up their data.

**Effective Knowledge-base**

As Golchevskiy and Yermolenko (2020) believe, the daily activities of an organization are generally related to routine tasks. Employees perform the same tasks every day, register and submit documents, request information from various departments, create analytical reports, and manage production. However, traditional workflows can be disrupted by force majeure, failure of frequently used services, missing data or loss of critical information, hiring new employees, structural changes within an organization, and more. In this situation, the task of quickly and effectively restarting workloads and minimizing these factors is often critical. In addition, at a certain stage of understanding the work process, the problem arises of applying the acquired skills

and knowledge, improving teamwork and communicating with customers. One of the solutions to the above and many other problems could be the introduction of knowledge bases into business processes (Golchevskiy & Yermolenko, 2020). A well-managed knowledge base can help bridge communication gaps not only between departments, but also between businesses and business customers. Knowledge bases can help reduce time spent training employees, improve incident management, and save money. Some benefits are immediately obvious, while others are difficult to quantify. “In today's information-driven economy, companies are creating the greatest opportunities and ultimately deriving the most value from their intellectual rather than physical assets” (Bhunje, 2013). For a knowledge base to be effective, the information it contains must be accurate, relevant, and up-to-date. Managers must carefully analyze the information provided by various groups within the business environment. Information provided by a group of people may need to be standardized to be meaningful to others within the organization (Reiser, 2013).

Furthermore, the data present in the knowledge base should answer the questions asked. This means that information overload must be avoided at all costs. This process of going through all the information and making it as accurate as possible while eliminating duplicate or irrelevant data can be simultaneously daunting, exhausting, and challenging. According to Dataware Technologies (1998), many knowledge management efforts fail because content editors are not given time to complete their tasks, resulting in "information pollution" and users abandoning the system.

**Quality Decision-Making**

high-quality decision-making processes are given for companies, they are not necessarily a common practice (Spetzler, Winter & Meyer, 2011). Researchers in the field of decision-making and judgment psychology advocate the use of a more structured approach to decision-making and the need to regularly measure the quality of the decision-making process to identify areas for improvement (Kahneman, 2011). Interest in the study of decision making has increased over the past two decades, and indeed the science of decision making is well established (Hammond, Keeney, & Raiffa, 1999; Thaler & Sunstein, 2009; Kahneman, 2011 2013; Spetzler, Winter & Meyer, 2011). Therefore, it seems worthwhile to consider whether the various findings and recommendations of this study can be incorporated into operations when decisions are made under conditions of uncertainty (Bujar, McAuslane, Walker, & Salek, 2020). The word "decision making" conjures up the image of choosing between two actions depending on the situation.

Structured decision-making guidelines are needed to help decision makers choose the best option to achieve a set goal or solve a problem. These compiled guidelines are called decision-making strategies (Obi & Agwu, 2017). Donnellan *et al.* (2015) investigated the factors that influence decision quality. Examples of factors they found include data quality, timing of decisions, and perception of decisions. Because of the importance of decision-making to organizations and their stakeholders, the quality of decisions has received significant attention. Hastie and Dawes (2010) specified that the quality of a decision should not be evaluated by the outcome of the decision, but by the extent to which the decision is justified. Rationality here refers to the use of available tools in a given situation to achieve the decision maker's goals. In a study by Elbanna *et al.*, (2014) hypothesized that five factors influence the quality of decision-making implementation - Trust, participation, past performance, implementation uncertainty, and speed of implementation of decisions. Among these factors, implementation uncertainty and speed were negatively correlated with the quality of decision implementation. Dietrich (2012) cited factors that influence decision making, including past experiences, individual differences, cognitive

biases, personal relevance beliefs, and commitment. In fact, most studies on this topic did not target public institutions in some studies. Therefore, the true picture of the factors that influence the quality of decision-making in these institutions remains unclear (Abazeed, 2019).

**Theoretical Framework**

The theoretical foundation for this study was based on the Technology Acceptance Model (TAM) of Davis, (1986).

**Technology Acceptance Model (TAM)**

Davis (1986), the proponent of TAM theory, posits that technology acceptance is predicted by users' behavioral intentions, which in turn are determined by the perceived usefulness of the technology in performing a task and the perceived ease of use. It is assumed that TAM was developed by Davis (1986) with the aim of investigating the influence of technology on user behavior and establishing a theory of the user's computer-he technology behavior (Rauniar, Rawski, Yang, & Johnson, 2014). This model was originally developed from another theory called the Theory of Reasoned Action (TRA), which describes human behavior based on intentions, and was established by Fishbein and Ajzen (1975) (Rauniar et al., 2014). The TRA model aims to develop a theory that explains human behavior in general, whereas the TAM focuses on factors that influence humans' overall acceptance of computers (Rauniar et al., 2014). TAM consists of two main components: “Perceived Usefulness” (PU) and “Perceived Ease of Use” (PEU), which influence a person's intention to use the technology (Davis, 1986; Liu, Chen, Sun, Wible, & Kuo, 2010). Venkatesh and Davis (2000) extended the original TAM model to create TAM2. This model includes additional elements, namely social influence processes (subjective norms, spontaneity, image) and cognitive instrumental processes (task relevance, product quality, result verifiability and perceived processes) (p. 187). In fact, their study shows that the TAM2 model provides more detailed information than the regular TAM model by accounting for the key element of perceived usefulness, which is an antecedent of usage behavior (Venkatesh and Davis, 2000). Nevertheless, TAM only provides a general overview of an individual's technology acceptance (Liu *et al.*, 2010).

This study conceptualized the following framework as a guide through the study.



**Fig. 1.1:** Framework of Data Digitization Strategies and Information Management Success of State-owned Tertiary Institutions in Rivers State, Nigeria.
**Source: Researcher's Conceptualization, 2024**

## Methodology

This study is a descriptive study as such adopted a cross-sectional survey design suitable for this study. The study censused four (4) State-owned Tertiary Institutions in Rivers State; however, for the purpose of this study, the targeted Study elements comprised of the Management and Administrative staff members of the information technology and administrative departments of the four State-owned Tertiary Institutions in Rivers State. Hence, the elements of this study were fifty respondents which comprised senior and junior cadres of the Information technology and administrative department staff members of the State-owned Tertiary Institutions in the Rivers State. Thus, 50 copies of the structured close ended 4point lykert scale questionnaire were administered on the categories of employees that formed the respondents. The reliability test of the structured questionnaires was ascertained through Test-re-test in which a pilot administration of the questionnaire was made on a portion of the chosen sample and administered after two months and relationship between the two results determined by correlation coefficient, through SPSS version 20. Our reliability test was also anchored on the Cronbach Alpha at 0.7. At the primary level of our analysis, this study adopted the use of univariate descriptive statistical tool such as mean, standard deviation, frequency tables, simple percentages, bar charts and histograms to present the data that was generated while for bivariate inferential statistics, the Pearson's Product Moment Correlation was employed at the secondary level of analysis, to test the hypothesized statements. All the statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) version 23.0.; because this version has the ability to transform scaled data into discrete or continued data and vice versa.

## Decision rule

Reject Ho if PV< 0.05
Accept Ho if PV > 0.05

**Table 1 Showing Strength and Direction of Relationship between Variables**

| Range of values | Degree of relationship |
|---|---|
| $\pm 0.00 - \pm 0.19$ | Very weak |
| $\pm 0.20 - \pm 0.39$ | Weak |
| $\pm 0.40 - \pm 0.59$ | Moderate |
| $\pm 0.60 - \pm 0.79$ | Strong |
| $\pm 0.80 - \pm 1.00$ | Very strong |

## Test of Hypotheses

**$H_{01}$**: There is no significant relationship between Digital Backup and Effective Knowledge-base in State-owned Tertiary Institutions in Rivers State

**Table 2 Relationship between Digital Backup and Effective Knowledge-base**

| | | Digital Backup | Effective Knowledge-base |
|---|---|---|---|
| Digital Backup | Pearson Correlation | 1 | .710** |
| | Sig. (2-tailed) | | .000 |
| | N | 44 | 44 |
| Effective Knowledge-base | Pearson Correlation | .710** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 44 | 44 |

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 2, it can be observed that there is a correlation coefficient of 0.710** between Digital Backup and Effective Knowledge-base, indicating a strong and positive relationship between Digital Backup and Effective Knowledge-base. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Digital Backup and Effective Knowledge-base. This further implies that most of the changes in Effective Knowledge-base among State-owned Tertiary Institutions in Rivers State are caused by their Digital Backup while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Digital Backup and Effective Knowledge-base of State-owned Tertiary Institutions and incline to the alternate hypothesis that there is a strong, significant relationship between Digital Backup and Effective Knowledge-base of State-owned Tertiary Institutions.

**$H_{02}$**: There is no significant relationship between Digital Backup and quality decision-making in State-owned Tertiary Institutions in Rivers State

**Table 3 Relationship between Digital Backup and Quality decision-making**

| | | Digital Backup | Quality decision-making |
|---|---|---|---|
| Digital Backup | Pearson Correlation | 1 | .843** |
| | Sig. (2-tailed) | | .000 |
| | N | 44 | 44 |
| Quality decision-making | Pearson Correlation | .843** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 44 | 44 |

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 3, it can be observed that there is a correlation coefficient of 0.843** between Digital Backup and quality decision-making, indicating a very strong and positive relationship between Digital Backup and quality decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between Digital Backup and quality decision-making. This further implies that most of the quality decision-making experienced among State-owned Tertiary Institutions in Rivers State is caused by their Digital Backup while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Digital Backup and quality decision-making of relationship between Digital Backup and quality decision-making of State-owned Tertiary Institutions.

## Discussion of Findings

The analysis of the study revealed a correlation coefficient of 0.710** between Digital Backup and Effective Knowledge-base, indicating a strong and positive relationship between Digital Backup and Effective Knowledge-base. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Digital Backup and Effective Knowledge-base. The analysis results also revealed a correlation coefficient of 0.843** between Digital Backup and quality decision-making, indicating a very strong and positive relationship between Digital Backup and quality decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between Digital Backup and quality decision-making. The findings of this study are consistent with the findings of Adiele and Obara (2022) whose study probed-into the relationship between data preservation and agility of deposit-money banks in Rivers State, Nigeria. The study adopted a cross-sectional survey design. The result of the study revealed a positive significant

relationship between the study variables. The study found a positive significant relationship between data preservation and agility of deposit-money banks in Rivers State, Nigeria.

**Conclusion**

In line with the findings of this study and to the extent of its consistency with results of similar previous studies, we conclude that data digitization strategies have a positive significant relationship with Information management success of State-owned Tertiary Institutions in Rivers State.

**Recommendations**

Based on the findings of the study and to the extent of its consistency with the result of similar studies we make the following recommendation.

a. Administrators of State-owned Tertiary Institutions should capitalize on the pivot role of Digital Backup in their operations to ensure their Information management success.

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