The Role of AI in Improving Digital Archiving in University Libraries

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Abstract. Artificial intelligence (AI) techniques present new opportunities to enhance digital archiving practices in academic libraries. This study surveyed 77 university librarians in Jordan to examine the impact of various AI applications on improving digital archiving systems. Dimensions studied included metadata extraction, content recognition, recommendations, translations/transcriptions, preservation, and data analytics. Results of a multiple linear regression indicated AI significantly influences digital archiving, with data analytics exhibiting the strongest effect. Qualitative feedback also revealed promising adoption in leveraging AI to index resources, preserve fragile materials, and uncover usage insights. The findings provide a useful assessment of integrating AI for next generation library archival management. Practical recommendations center on staff training in AI competencies and cross-institutional knowledge exchange. Further research into user perceptions is also warranted.

Keywords: Artificial Intelligence, Automated Metadata Extraction, Image and Text Recognition, Content Recommendation, Translation and Transcription, Content Preservation, Data Analytics, Digital Archiving Systems

1. Introduction

The great importance of libraries, especially in universities, cannot be denied. The Internet may sometimes be sufficient for researchers, but they reach a point where they must use the library in its traditional form in order to access the required information. Today, the great importance of the necessity of digitizing university libraries in all aspects and methods has emerged. Today, digitization has become one of the things that contributes significantly to preserving library materials in a way that is easy to preserve, transfer, and share. Digitization technology today also provides many services to libraries, including converting paper books and documents into digital formats, preserving cultural and historical content and providing it for future generations (Niqresh et al., 2021).

The practice of digital archiving for Jordanian university libraries has a customized reality based on requirements such as the size of the institution, available resources, infrastructure, technology improvements, and Higher education institution priorities (Al-Jaradat, 2021). The program may be directed at the implementation of digitization projects, converting the physical media to digital, and it will entail rare books, manuscripts, and special collections (Alshawabkeh et al., 2020). The primary aim of institutional repositories is to archive and distribute the scholarly output that includes research papers, and dissertations. Libraries develop digital preservation policies to ensure the digital materials are available in the long-term and that their quality is maintained, which includes having the materials stored safely, having backup copies, accurately describing them by the use of metadata, and by moving (or migrating) them from one format to a more modern one (Awamleh and Hamad, 2022). Collaboration on a shared platform and through consortia ensures resource-sharing and skills-based exchange among the libraries. Digital libraries utilize modern technologies and software, including online catalogs, digital archives, intuitive access, and use of metadata standards and search functions for easy discovery and retrieval (Hamad et al., 2023).

Based on what was previously mentioned, it was seen that the literary gap lies in the lack of studies that took into perspective the concept of digital archiving. As far as the researcher knows, there appeared no studies that examined the influence of AI on archiving in libraries. In addition to that, there appeared a lack in explaining how AI managed to change the process of archiving into the digital version. So, this study came as an impetus to learn how artificial intelligence (AI) can impact library archiving is basically to be able to identify ways in which AI can be used in archiving to improve accuracy. AI technologies automate certain tasks through doing the heavy work of tagging metadata and information browsing which are essentials for ordering and managing digital contents. Moreover, AI contribute toward evaluating the threats and provide viable solutions. Using AI-driven searches, people can better navigate all the content that are available. Not only does AI let deep analysis of data but also provides important information for differentiated decisions and better services. Considering ethical and legal aspects of AI is vital for AI integration that would not be unfair. Through AI cross examination, the libraries can bargain out the utility of AI and its capabilities in the archiving and optimization of preservation, access and user experience as well as in the fixing the digital preservation challenges.

From that point, current study aimed to explore the effective role of AI dimensions (Automated Metadata Extraction, Image and Text Recognition, Content Recommendation, Translation and Transcription, Content Preservation, Data Analytics) on digital archiving systems within university's libraries from perspective of librarian during the academic year 2022-2023.

Realizing the aim of study was done through building the following mode, and from which study hypotheses were extracted:
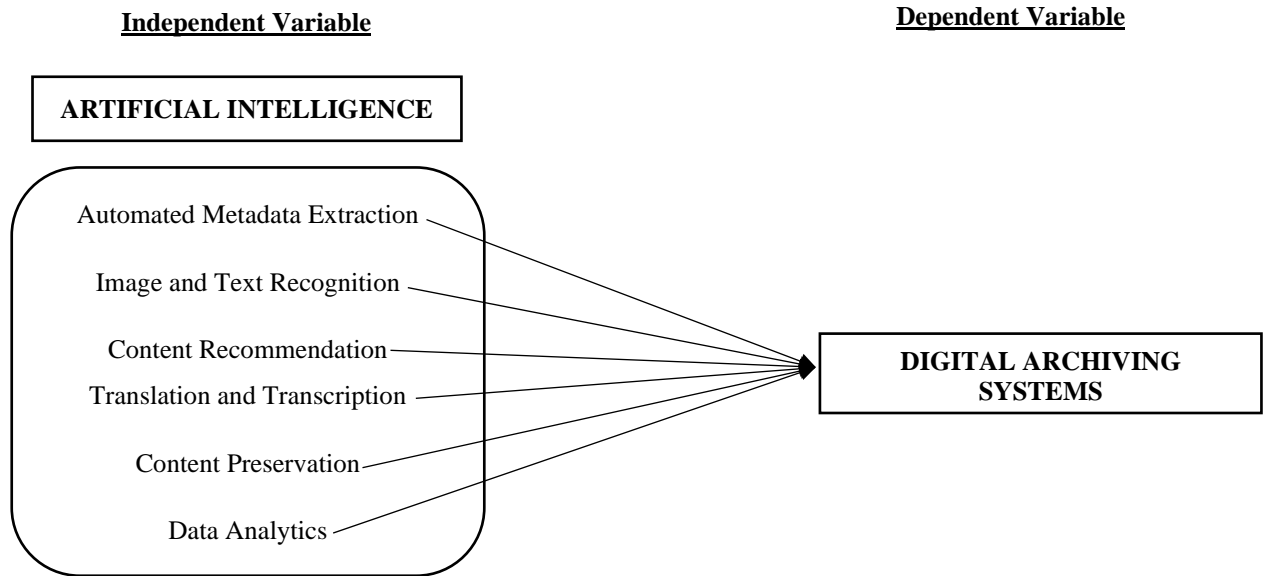
<u>**Independent Variable**</u>   **Dependent Variable**

┌─────────────────────────────────┐
│ **ARTIFICIAL INTELLIGENCE**   │
└─────────────────────────────────┘

Automated Metadata Extraction

Image and Text Recognition

Content Recommendation

Translation and Transcription   ┌──────────────────────┐
                                                  │ **DIGITAL ARCHIVING** │
Content Preservation   │ **SYSTEMS**   │
                                                  └──────────────────────┘
Data Analytics

Fig.1: Study Model ^{Late et al. (2023); srael and Amer (2023); Aske and Giardinetti (2023); Randby and Marciano (2020)}

Main Hypothesis:

H: There is a statistically significant influence at (≤0.05 p) of AI in improving digital archiving systems in Jordanian university libraries

Sub-Hypotheses:

H1: There is a statistically significant influence at (≤0.05 p) of automated metadata extraction in improving digital archiving systems in Jordanian university libraries

H2: There is a statistically significant influence at (≤0.05 p) of image and text recognition in improving digital archiving systems in Jordanian university libraries

H3: There is a statistically significant influence at (≤0.05 p) of content recommendation in improving digital archiving systems in Jordanian university libraries

H4: There is a statistically significant influence at (≤0.05 p) of translation and transcription in improving digital archiving systems in Jordanian university libraries

H5: There is a statistically significant influence at (≤0.05 p) of content preservation in improving digital archiving systems in Jordanian university libraries

H6: There is a statistically significant influence at (≤0.05 p) of data analytics in improving digital archiving systems in Jordanian university libraries

2. Literature Review

2.1. Artificial Intelligence in Library Management

According to Okunlaya et al. (2022), library management is one of the vital fields that requires a lot of organization and control, especially in the field of knowledge resources. Libraries are also a fertile environment for printed, photographed and recorded materials and require many efforts to preserve these materials and ensure access to them. The birth of artificial intelligence has improved library management and enhanced the accuracy and efficiency of the organizational processes at the level of existing resources and beneficiaries of these libraries (Harisanty et al., 2022). Mali and Deshmukh (2021) and Khanzode and Sarode (2020) believe that most of the services provided by artificial intelligence in the field of library management are:

- Improving search and retrieval processes through machine learning and natural language processing

- Personalize services by analyzing beneficiaries' data and recommending resources that suit their interests
- Artificial intelligence has an active role in the archiving process by classifying existing materials in an efficient manner
- Analyzing beneficiary behavior and recommending strategic decisions to enhance the beneficiary experience

2.2. Dimensions of AI in Library Management

Previous literature did not frankly note for the influential aspects of AI within library management (Christel, 2022; Hassani et al., 2020; Olivettiet al., 2020). However, there was many indicators through the literature that examined how AI eased and supported digital archiving in Libraries, this was mentioned by Late et al. (2023), srael and Amer (2023), Aske and Giardinetti (2023) and Randby and Marciano (2020):

Automated Metadata Extraction
Artificial intelligence plays a crucial role in processing and classifying metadata and digital assets in archives. It relies on machine learning and natural language processing to access, classify, extract and convert data into digital files. In addition to its ability to organize duplicate and descriptive data such as author names, different titles, keywords and descriptions related to existing resources. This enhances the efficiency of the archiving process and allows librarians to discover content in an easy and quick way.

Image and Text Recognition
AI algorithms are currently being employed to recognize written texts and various images and archive them directly. AI technologies in this field serve in the field of face recognition, identifying images, and identifying them with a tag that enables the beneficiary to refer to them later. Through Optical Character Recognition (OCR), AI can also extract various texts from scanned or even handwritten resources, enhancing accessibility, search and retrieval for librarians and patrons.

Content Recommendation
AI offers recommendation systems. These systems analyze the behavior of patrons and librarians based on their preferences, search history, and thus provide recommendations that suit their preferences. Through AI, it is also possible to suggest specific content as desired by referring to interest and previous browsing, saving the individual time in searching and searching for the required resources. This not only enhances the beneficiary's experience, but also helps uncover new resources that may be of value to the beneficiary.

Translation and Transcription
Machine translation and character and word recognition are among the technologies provided by AI to electronic libraries, as these technologies translate archived speech, organize it, and classify it as required. These technologies can also, with the help of natural language, translate text or content into various languages. This enhances accessibility and converts recorded materials into written resources, which facilitates the process of preserving resources and ensuring that they do not deteriorate over time.

Content Preservation
This dimension is considered one of the most important dimensions of digital archiving, as through AI and various technologies errors in resources are detected and addressed, and then archived and preserved in the long term. The form of this dimension has great importance in the field of ancient recordings, which have now become possible to convert them into digital files, save them easily, and ensure the possibility of referring to them when needed. In addition, at the level of images and video,

AI and various existing technologies can work to improve the quality of the content, such as improving the clarity of images or video, or converting them to various other formats for the purposes of sharing or transferring. This helped enhance the possibility of preserving resources and reducing the risks of damage, loss, or even obsolescence.

Data Analytics

Through big data analytics, AI can read many data of different shapes and quantities and extract valuable and meaningful insights. In addition, AI, relying on machine learning, helps librarians access certain patterns, trends, and different relationships between resources and archive contents, thus helping to classify them according to these relationships. This helps in decision-making processes and enhances the beneficiary experience (Hashem, et al, 2022).

2.3. Digital Archiving Systems

Milioni et al. (2020) defined digital archiving as the process through which paper materials, documents, photos, and audio tapes are converted into digital materials, stored, and preserved for the purpose of facilitating access to them when needed. Digital archiving has proven its worth in the science of library management through its ability to manage the rights of use and ownership of materials in the traditional form as according to Cox and Mazumdar (2022).

In addition to strengthening the foundations of indexing and preserving these materials by providing electronic storage systems in a way that facilitates reference to them. Broussard and Boss (2020) emphasized the same idea, adding that digital archiving has an effective role through digital imaging of texts, photographic and audio materials by converting them into digital images and tapes and storing them in a way that ensures their continuity.

Gul and Bano (2019) indicated that digital archiving has provided librarians with many advantages, the most important of which is ease of access and use, as individuals can access and use materials at any time without fear of damage, in addition to the advantage of retaining the original material and avoiding damage or negative impact from environmental factors. De Kosnik (2021) pointed out that the most important advantages of digital archiving are the possibility of providing a large space capable of containing huge metadata compared to traditional archiving, in addition to the possibility of immediate retrieval of the stored material based on various search tools in digital systems.

2.4. Related Work

Rolan et al. (2019) examined in their study the use of AI in classifying and preserving archives and records in Australia. Authors applied their study on Australian government and tried to examined the reality of AI usage in digital archiving on governmental level. Results of study indicated that AI managed to help Australian government preserve, classify and evaluate their records in addition to digitally preserve it for future use. In addition to that, applying AI techniques in digital archiving proved its efficiency in analyzing metadata and present recommendations for content.

Cordell (2020) tried to examine in their study the use of AI in libraries, mainly the Congress Library and examined the possible benefits of employing AI (machine learning) within the practices of librarians. The study reached conclusion that AI and mainly machine learning managed to increase searchability among handwritten and pictured documents. In addition to that, it played a role in managing audio and visual materials preserve content and translate transcriptions.

Safder et al. (2020) through the study, researchers confirmed that adopting AI in electronic libraries contributes significantly to enhancing the effective retrieval of metadata through a set of algorithms that treat large texts like traditional documents. Through search engines supported by deep and machine learning algorithms, these engines can deal with metadata extraction and facilitate the task of librarians in extracting false symbols in large texts and confusing sentences based on machine learning techniques. The researchers also found that deep learning, machine learning, and deep neural networks techniques

achieved high accuracy in translating and transcription texts, which enhanced the benefits of digital archiving.

Cox et al. (2019) examined in their study the impact of artificial intelligence on academic libraries and how it affects the mechanism of libraries in universities. The study relied on qualitative methodology by conducting interviews with (33) academic university librarians. The study reached the conclusion that there is an impact of artificial intelligence in areas that include organizing data and resources, in addition to facilitating the task of metadata extraction and data recognition.

Taking a deep look at previous studies, it was seen that Rolan et al. (2019) confirmed the effectiveness of AI technology in archiving of and digital preservation of the records with long-term intent. While Cordell (2020) demonstrated that AI technology has the ability to save the recording and transcribing of content. Along with Safder et al. (2020) who affirmed trough their research that the AI application in electronic libraries increased the chances of the metadata extraction via algorithms treating texts like it was a desktop computer or laptop. And Cox et al. (2019) who agreed that AI can influence retrieving data sets and resources. There wasn't much emphasis on the intersection between AI and archiving in libraries, and that is what distinguished the current study.

3. Methods

3.1. Methodological Approach

Realizing aim of current study was done through adopting the quantitative methodology. This was attributed to the ability of quantitative approach to collect primary data from a larger sample size. This would help us generalize the reached results.

3.2. Tool of Study

A questionnaire was deemed to be the main data collector in current study. We have built the questionnaire on Likert 5-point scale and it appeared in two main sections. The first took into perspective demographic of study sample (age, gender, experience and qualification). While the other section took into perspective statements related to study variables including (Automated Metadata Extraction, Image and Text Recognition, Content Recommendation, Translation and Transcription, Content Preservation, Data Analytics). For the sake of validity of questionnaire items, a group of specialist and academics in the field arbitrated questionnaire statements. All items were modified according to their perspective and some of them were omitted. The questionnaire in its final version reached 35 statements as according to the following table:

Table 1. Distribution of Items on Questionnaire Variables

Variable	# of Items
Artificial Intelligence	
Automated Metadata Extraction	5
Image and Text Recognition	5
Content Recommendation	5
Translation and Transcription	5
Content Preservation	5
Data Analytics	5
Digital Archiving Systems	5

3.3. Population and Sampling

Population of study consisted of all universities' libraries librarian in Jordan. A convenient sample of (95) individuals was chosen to represent population of study. The questionnaire was uploaded online through Google Forms in order to collect primary data. After application process, researcher was able

to gain (77) properly filled questionnaire which indicated a response rate of 81.5% as statistically accepted. Collecting primary data was done following the research ethics of BERA were there was responsibility towards participants of research, responsibility towards community of research and participants consent were guaranteed before taking a step further (Brown, 2022).

3.4. Statistical Screening

Statistical Package for Social Sciences SPSS v. 23rd was chosen to tackle the collected primary data. Cronbach's Alpha (α) was used in order to check the reliability and consistency of study tool and it appeared that all variables scored higher than 0.70 indicating that the tool was reliable and consistence.

Table 2. Alpha Value

Variable	α
Automated Metadata Extraction	0.748
Image and Text Recognition	0.844
Content Recommendation	0.731
Translation and Transcription	0.77
Content Preservation	0.809
Data Analytics	0.783
Digital Archiving Systems	0.887

Other statistical tests employed in analysis included frequency and percentages, mean and standard deviation, multiple and linear regression. In order check the validity of questionnaire, it was presented before a group of specialists in the field for the sake of arbitration. Statements that gained more than 80% of arbitrators' approval were kept.

3.5. Underpinning Theory

It is worth mentioning here that the underpinning theory of current study is Information Retrieval Theory (IRT), Gerard Salton who is known as "father of modern information retrieval" coined this theory. It is based on knowledge of the techniques, tools and strategies necessary to retrieve information from a large sample of data. This theory is based on its adoption of a set of AI algorithms and technologies that reveal the systems used in information retrieval operations in libraries based on efficient and accurate digital archiving in university libraries (Sonawane et al, 2020).

4. Analysis and Discussion

4.1. Demographics

Frequency and percentages were calculated for respondents' demographics. It was seen that majority of respondents were males forming 80.5% of sample. In addition to that, study indicated that majority of respondents were within age range of 28-33 years old forming 41.6% and held MA degree forming 61%. Results also indicated that most of respondents had an experience of more than 10 years as librarians forming 54.5% of total sample.

Table 3. Demographics

	f	%
Gender		
Male	62	80.5
Female	15	19.5
Age		
22-27	16	20.8
28-33	32	41.6
34-39	12	15.6

	40-45	9	11.7
	+46	8	10.4
	Education		
	BA	23	29.9
	MA	47	61.0
	PhD	7	9.1
	Experience		
	2-5	13	16.9
	6-9	22	28.6
	+10	42	54.5
	Total	**77**	**100.0**

4.2. Descriptive Results of Questionnaire

Mean (μ) and standard deviation (σ) were calculated for questionnaire items as in the following table 3. It was seen that all statements and variables scored higher than mean of scale 3.00 which was seen as statistically positive. The highest variable scored a mean of 4.16/5.00 (content preservation) compared to the lowest – but still positive – which scored a mean of 3.92/5.00 (Automated Metadata Extraction).

Table 4. Questionnaire Analysis

Statement	μ	σ
All AI algorithms have the ability to analyze texts and content including images and diagrams	3.766	1.062
AI can extract the needed knowledge from a text , image or even media content	3.584	1.291
Metadata is extracted automatically form different media sources as according to queries	4.039	.910
Specific information such as names, dates, and authors or keywords can be easily extracted through metadata	3.987	.881
AI can reduce the manual efforts needed to complete a certain query and categorize digital data	4.260	.849
Automated Metadata Extraction	**3.927**	**.714**
Adopting AI can recognize optical characters from a media and extract them immediately	3.857	.996
All non-written media can be searchable and visible through image and text recognition	4.078	.823
AI can analyze images in order to identify visual content and information	4.091	.891
With image and text recognition, discoverability of media is wider and more apparent	4.234	.841
Text and image recognition have the ability to improve library's digital collections	4.091	.891
Image and Text Recognition	**4.070**	**.699**
AI empowered archiving is able to identify personal preferences	4.182	.914
Identifying personal preference makes it easier to give recommendations based on preferences	4.312	.950
AI is able to recognize browsing history for better suggestions and recommendations	3.857	1.200
This can enhance the user experience in a better approach	4.117	1.013
AI empowered archiving encourages the exploration of digital libraries	3.805	1.039
Content Recommendation	**4.055**	**.653**
With AI techniques, there are no language barriers	3.701	.947
Automatic translation and transcription of languages is available through AI	3.948	.872
AI can translate resources into different languages at once	3.896	.852
AI can recognize spoken language through speech recognition	4.182	.773
It can convert spoken language into text or audio content	4.182	.807
Translation and Transcription	**3.982**	**.615**
AI techniques can restore data that are exposed to deterioration	4.104	.926
All digital assets are stored in a way that guarantee their preservation	4.221	.868
AI empowered archiving have the ability to locate damage assets and restore them	4.247	.814
AI techniques are able to deal with fragile data based on their description	4.039	1.094
It is able to ensure the longevity of digital	4.221	.700
Content Preservation	**4.166**	**.670**
AI depends on patterns and identity to preserve digital data	4.286	.704
AI is able to give patterns and trends for queries and usages of the digital resources	4.078	.870
It is able to give valuable insights for concerned authorities	4.247	.781

AI facilitate data collection for better insights and analysis	3.753	1.078
AI efforts enhances the decision making process within libraries	4.117	1.000
Data Analytics	**4.096**	**.657**
Digital archiving through AI can decrease the need for manual efforts	4.143	.956
It helps with the discoverability and searchability of content according to queries	3.935	1.185
Digital archiving gives more efficiency and effectiveness for university libraries	4.117	.858
It enhances search engines giving more accurate information	4.195	.874
It is able to support decision making process for the concerned authorities	4.000	.987
Digital Archiving Systems	**4.078**	**.812**

4.3. Hypotheses Testing

Testing the main hypothesis was done depending on multiple regression. It was found that F value was statistically significant at the 0.05 level. This implies that there was a statistically significant influence at ($\leq$0.05 p) of AI in improving digital archiving systems in Jordanian university libraries. There is a strong correlation (R) of 0.796, indicating a significant relationship. Additionally, the independent variables accounted for **63.3%** of the variability in the dependent variable.

Table 5. Testing Main Hypothesis

	Coefficients						
		Unstandardized Coefficients		Standardized Coefficients				
Model		B	Std. Error	Beta	t	Sig.	R	R Square
1	(Constant)	.422	.452		.934	.354	.796ᵃ	.633
	Automated Metadata Extraction	-.101	.145	-.089	-.696	.489		
	Image and Text Recognition	-.101	.202	-.087	-.501	.618		
	Content Recommendation	-.085	.194	-.068	-.438	.663		
	Translation and Transcription	.010	.135	.008	.076	.940		
	Content Preservation	.226	.149	.186	1.521	.133		
	Data Analytics	.934	.135	.756	6.904	.000		
H: There is a statistically significant influence at ($\leq$0.05 p) of AI in improving digital archiving systems in Jordanian university libraries								

As for sub-hypotheses, linear regression was used and results indicated the following:

- The first hypothesis indicated that F value was statistically significant at a significance level of 0.05. That meant *there was a statistically significant influence at ($\leq$0.05 p) of automated metadata extraction in improving digital archiving systems in Jordanian university libraries*, exhibiting a moderate correlation (R) of 0.308. The independent variable accounted for **9.5%** of the variability in the dependent variable.

- The second hypothesis determined that the F value was statistically significant at a significance level of 0.05. That meant *there is a statistically significant influence at ($\leq$0.05 p) of image and text recognition in improving digital archiving systems in Jordanian university libraries*, exhibiting a moderate correlation (R) of 0.239. The independent variable accounted for **5.7%** from the variability in the dependent variable.

- The third hypothesis determined that the F value was statistically significant at a significance level of 0.05. That meant *there is a statistically significant influence at ($\leq$0.05 p) of content recommendation in improving digital archiving systems in Jordanian university libraries*,

exhibiting a moderate correlation (R) of 0.289. The independent variable accounted for **5.7%** from the variability in the dependent variable.

- The fourth hypothesis determined that the F value was statistically significant at a significance level of 0.05. That meant *there is a statistically significant influence at (≤0.05 p) of <u>translation and transcription</u> in improving digital archiving systems in Jordanian university libraries*, exhibiting a moderate correlation (R) of 0.402 the independent variable accounted for **16.2%** from the variability in the dependent variable.

- The fifth hypothesis determined that the F value was statistically significant at a significance level of 0.05. That meant *there is a statistically significant influence at (≤0.05 p) of <u>content preservation </u>in improving digital archiving systems in Jordanian university libraries*, exhibiting a strong correlation (R) of 0.603 the independent variable accounted for **16.2%** from the variability in the dependent variable.

- The sixth hypothesis determined that the F value was statistically significant at a significance level of 0.05. That meant *there is a statistically significant influence at (≤0.05 p) of <u>data analytics</u> in improving digital archiving systems in Jordanian university libraries,* exhibiting a strong correlation (R) of 0.775 the independent variable accounted for **60%** from the variability in the dependent variable.

Table 6. Testing Sub-Hypotheses

| | | Coefficients | | | | | | |
| | | Unstandardized Coefficients | | Standardized Coefficients | | | | |
Model		B	Std. Error	Beta	t	Sig.	R	R Square
1	(Constant)	2.701	.498		5.423	.000	.308ᵃ	.095
	Automated Metadata Extraction	.350	.125	.308	2.808	.006		

H1: There is a statistically significant influence at (≤0.05 p) of automated metadata extraction in improving digital archiving systems in Jordanian university libraries

| | | Coefficients | | | | | | |
| | | Unstandardized Coefficients | | Standardized Coefficients | | | | |
Model		B	Std. Error	Beta	t	Sig.	R	R Square
1	(Constant)	2.948	.538		5.480	.000	.239ᵃ	.057
	Image and Text Recognition	.278	.130	.239	2.131	.036		

H2: There is a statistically significant influence at (≤0.05 p) of image and text recognition in improving digital archiving systems in Jordanian university libraries

| | | Coefficients | | | | | | |
| | | Unstandardized Coefficients | | Standardized Coefficients | | | | |
Model		B	Std. Error	Beta	t	Sig.	R	R Square
1	(Constant)	2.624	.564		4.653	.000	.289ᵃ	.083
	Content Recommendation	.358	.137	.289	2.610	.011		

H3: There is a statistically significant influence at (≤0.05 p) of content recommendation in improving digital archiving systems in Jordanian university libraries

| | | Coefficients | | | | | | |
| | | Unstandardized Coefficients | | Standardized Coefficients | | | | |
Model		B	Std. Error	Beta	t	Sig.	R	R Square
1	(Constant)	1.962	.562		3.490	.001	.402ᵃ	.162
	Translation and Transcription	.531	.140	.402	3.807	.000		

H4: There is a statistically significant influence at (≤0.05 p) of translation and transcription in improving digital archiving systems in Jordanian university libraries

	Coefficients						
	Unstandardized Coefficients		Standardized Coefficients				
Model	B	Std. Error	Beta	t	Sig.		
1 (Constant)	1.034	.471		2.195	.031		
Content Preservation	.731	.112	.603	6.545	.000		

H5: There is a statistically significant influence at (≤0.05 p) of content preservation in improving digital archiving systems in Jordanian university libraries

	Coefficients						
	Unstandardized Coefficients		Standardized Coefficients				
Model	B	Std. Error	Beta	t	Sig.	R	R Square
1 (Constant)	.155	.375		.414	.680	.775[a]	.600
Data Analytics	.958	.090	.775	10.607	.000		

H6: There is a statistically significant influence at (≤0.05 p) of data analytics in improving digital archiving systems in Jordanian university libraries

4.4. Discussion

Current study aimed at exploring the effective role of AI dimensions (Automated Metadata Extraction, Image and Text Recognition, Content Recommendation, Translation and Transcription, Content Preservation, Data Analytics) on digital archiving systems within university's libraries from perspective of librarian during the academic year 2022-2023. Quantitative methodology was adopted, and a questionnaire was administered by (77) librarians within libraries of Jordanian universities.

Results indicated as a start that respondents had a good level of awareness regarding the usage of AI within library management. In addition to that, study found that there was a good level of adoption of AI techniques within Jordanian universities' libraries. This was seen to be a promising result that may enhance the future of libraries in Jordan.

Through the results and previous literature, the study found that there is an effective role for artificial intelligence in improving and developing the foundations of digital archiving. This led to a significant improvement in library services. It also contributed to enhancing the beneficiary's experience through many artificial intelligence techniques and improving the results of classification and organization of library resources in their various forms, which supported the process of research accuracy and enhanced the possibility of accessing the required resources with less time and effort.

At the level of library services, the study found that AI has proven its worth in the field of data analytics by enhancing reliance on big data analysis and trying to reach clear insights that support the decision-making process at the first level, and then provide successful recommendations to beneficiaries at another level. This matter is consistent with the results of Rolan et al (2019) who confirmed that there is an impact of data analysis in improving digital archiving by relying on machine learning algorithms and activating them in the field of dealing with large and cluttered data. The variable of data analytics scored the highest in analysis compared to other adopted variables which reached 60%.

On the second rank, there appeared the influence of both translation and transcription and content preservation with variance of 16.2% for both influencing digital archiving. This indicated that AI techniques enhanced the process of digital archiving by increasing the possibility of artificial intelligence techniques to translate existing library resources into different languages by relying on deep learning algorithms and natural language processing. Through these technologies, artificial intelligence is able to reduce time for beneficiaries and convert various resources into different languages in order to enhance communication between students from different parts of the world. As for the level of copying and transfer, it was noted that AI improved the process of transferring resources and copying

them into digital formats, which facilitated the process of transferring and sharing them among various circles, in addition to enhancing the levels of preservation of historical and cultural resources that are threatened with damage. This is consistent with Rolan et al. (2019), Cordell (2020 and Safder et al. (2020).

In the third rank, there appeared automated metadata extraction which counted for 9.5% as a variance. This meant that AI supported digital archiving through the possibility of AI in enhancing digital archiving through automatic identification of large and cluttered data, improving the accuracy of extracting information from it. In addition to dealing with noise and errors that may exist in very large data, enhancing its automation, and reaching information and insights that are useful in operations an decision making. Such results agreed with Rolan et al. (2019), Safder et al. (2020) and Cox et al. (2019).

In the final rank, there appeared the sub-variables of image and text recognition and content recommendation which accounted or 5.7% as a variance. This indicated that AI supported digital archiving by easing the process of identifying sources from a photo, video or even a handwritten text and transforming it into a digital form. This helped in increasing the chances of preserving sources that might be endangered and ease its ability to share and multiply as needed.

5. Conclusion

This pioneering study makes an important empirical contribution in assessing AI adoption for digital archiving management in Jordanian university libraries. Findings confirm AI holds meaningful potential to automate the identification, translation, recommendation, and preservation of multimedia resources. Specifically, automated metadata extraction and translation tools exhibit particular promise in facilitating discoverability and access. Integrating qualitative user feedback also provides direction for improving system design and staff training. While constrained by sampling limitations, these results advocate for greater institutional investment in AI infrastructure to unlock the next phase of archives modernization. Further research should concentrate on evaluating user experience impacts with expanded methodology

5.1. Recommendations

Based on the results obtained, the current study recommends the following:

- Jordanian university libraries should consider integrating artificial intelligence technologies into their digital archiving systems
- The need to provide training programs and initiatives in order to build the capabilities of curators and staff of university and academic libraries and develop their skills in artificial intelligence and its relationship to digital archiving.
- The need to encourage cooperation and exchange of knowledge between Jordanian university libraries and foreign university libraries, especially in the field of artificial intelligence in digital archiving.
- The need to evaluate the impact of archiving systems supported by artificial intelligence in the libraries of Jordanian universities currently in place

5.2. Theoretical and Practical Implications

The current study has important theoretical and practical implications. The theoretical implications were that the study contributed to expanding the understanding of specialists in the field of digital archiving by relying on artificial intelligence techniques. In addition to providing a better and deeper understanding of the relationship between AI and digital archiving in order to develop subsequent and advanced research models. On a practical level, the study would demonstrate the mechanism for

improving digital archiving in academic libraries for the purposes of saving time and effort and enhancing the beneficiary's experience. The current study could also work to improve the foundations of access to various library resources based on content recommendations, translation, phonetic transcription, and the ability to recognize images and texts, even if handwritten.

5.3. Limitations

Current study was limited to librarians of Jordanian universities who were able to reach the questionnaire online through Google Forms. There weren't any primary data that was collected in person by researcher. In addition to that, current study was limited to librarians working within Jordanian universities during the academic year 2022-2023.

5.4. Future Studies

Launching from results of study, researcher recommended the following future research orientations:
- Examine beneficiaries satisfaction of employing AI in libraries and their attitudes regarding services
- Carry out a study that examines the role of AI in preserving security of data within university libraries
- Examine the influence of employing AI in universities'' libraries and its role in encouraging students to increase their dependency on their university's library.

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