

# The Role of Artificial Intelligence Abilities in Library Services

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**Abstract:** *Artificial intelligence applications are one of the most important modern technologies that have emerged in recent times, which have shaped a major change in the functions of institutions, especially the scope of libraries and information. This study was described the role of Artificial Intelligence Applications of knowledge management in different information organizations, as well as to identify the reality of employing artificial intelligence applications in libraries to enrich the Knowledge Management, exposing the relationship between artificial intelligence applications and its ability to develop technical and administrative processes in libraries of Knowledge Management and Knowing the challenges facing the libraries to apply the artificial intelligence applications.*

*The research is based on descriptive method by content analysis of literature review by listing the most important and related published Arabic and foreign literature it was token the studies that are focused in Artificial Intelligence Applications of knowledge management in information organizations.*

*The study conclude that the most important results of which are: There are a lot of libraries that apply artificial intelligence technology in their services, whether technical in the provision of services, references and others, which undoubtedly facilitated the ease of retrieval and search for the users, the available studies discussed various aspects of the reality that this new application plays in facilitating library services, and most studies agree on that to facilitate services and their quality intelligence and the application of artificial intelligence requires the availability of a set of basic ingredients and requirements, such as strong technical equipment, and qualified human resources capable of using and developing this technology. The study recommended the necessity for libraries and information centers to strive to keep pace with the changes of artificial intelligence and to make the right investment for knowledge management, increasing field studies to explore the requirements of artificial intelligence technologies and diversity in the services provided by artificial intelligence in the library and activating them effectively.*

**Keywords:** *Artificial intelligence, information organizations, knowledge management.*

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## 1. Introduction

The world now has witnessed many technological changes, that affecting the lives of everyone and any institutions, and it is no longer confined to a specific group, but accompanied everyone and every organization.

This change of technologies due to the great benefit that serves everyone. In light of this information inflation, there are many applications that appeared and facilitated the operations, applications to share in that. Applications of artificial intelligence are a major development that affected and facilitated many of the processes that humans perform and simulate their actions with the existence of systems designed for this, and it includes all processes that simulate the genius and innovation of electronic computers.

Modern information and communication technologies are among the changes taking place in various fields and have a vital role in knowledge management. Therefore, information institutions must

keep pace with these changes and respond to them in the communication services and sectors of the beneficiaries.

Saleh [23] asserts that at the beginning of the third millennium, there was a discussion arose about the importance of technology in knowledge in general and in libraries in particular, as the computer and the Internet are among the priorities of education and cognitive attention that was found specifically for management and organization in libraries and information centers.

In addition to the development of information and communication technologies it can utilizing it in knowledge management because Artificial Intelligence technologies have the ability to connect and support physical entities interact with the human element.

They are undoubtedly able to delve into the use and application of such applications to facilitate the operations that they undertake.

## 2. Problem Statement

There are many technological applications that are witnessing a wide development in various fields, and libraries and information centers have a share in that, which will make a major change in the services provided, given the large and diverse intellectual production witnessed by many libraries, so applications of artificial intelligence came to present a new form in Library environment.

There are relation between the importance of artificial intelligence applications in supporting the technical and administrative processes provided by academic libraries related to the Knowledge Management, and many of them have worked hard to implement such modern technology, hence the idea of providing such modern technology and its application in order to facilitate the operations of the library the researcher may have the desire and need to conduct such a study.

## 3. The Study Objectives

1. Identify the reality of employing artificial intelligence applications in libraries to enrich the Knowledge Management.
2. Exposing the relationship between artificial intelligence applications and its ability to develop technical and administrative processes in libraries of Knowledge Management.
3. Knowing the challenges facing the libraries to apply the artificial intelligence applications.

## 4. The Study Questions

1. What is the reality of employing artificial intelligence applications in libraries to enrich the Knowledge Management?
2. What is the relationship between artificial intelligence applications and their ability to develop technical and administrative processes in libraries of Knowledge Management?
3. What are the challenges that facing the libraries to apply the artificial intelligence applications.

## 5. The Importance of the Study

### 5.1. Theoretical significance

The application of artificial intelligence is one of the recent topics that have appeared in the technological area at the present time, and due to the rapid technological progress in this field and the resort for many institutions to adopt modern technology, there may be more studies that talk about this topic. By reviewing intellectual production, I find many Arab studies. And the foreigner that has dealt with this topic from different points of view and the extent of its application in many institutions, including the

information institutions that use it in many technical and administrative services, so we hope that this study will contribute to the enrichment of the Arab and foreign literature.

### 5.2. Practical Significance

It is hoped that the results will benefit libraries to know everything that related to artificial intelligence technology and how it can be employed in technical and administrative processes, in order to improve the services provided and to identify the most prominent challenges and work to address them and contribute to improving the cognitive services provided by information organization. Its also importance due to the fact that most of the aspects related to employing this new technology must be examined, with reference to the most important requirements that it needs.

It is hoped that the results of this study will contribute to improving the cognitive services provided by information organization.

## 6. The Limits of the Study

*Place Limits:* The libraries (academics, public, school, private..)

*Objective Limits:* Focusing on studying the applications of artificial intelligence that are usable and applicable in libraries, while clarifying the relationship between applications of artificial intelligence on the development of technical and administrative processes provided by libraries from the studies.

## 7. Terminology of the study

### 7.1. Artificial Intelligence:

It is the science that makes machines imitate the way human intelligence in their actions and actions. They are a group of computers that have been developed and shaped to think like a human being, and they have the ability to learn from their mistakes, and carry out their tasks in a fast and super skilled way.

### 7.2. Libraries

A place that provide their services to their beneficiaries of all categories of students, researchers or readers, under the supervision of persons who are professionally specialized in libraries and administration. It includes all the resources that help the beneficiaries to benefit from them [1].

### 7.3. Knowledge Management

Knowledge Management as the practice of selectively applying knowledge from previous experiences of decision making to current and future decision-making activities with the express purpose of improving the organization's effectiveness.

## 8. Research Method

The study aimed to identify the reality of employing artificial intelligence applications in libraries, and to reveal the relationship between artificial intelligence applications and their ability to develop technical and administrative processes in academic libraries. Therefore, the study applied the Descriptive method by content analysis of literature review with the most important and related published Arabic and foreign literature. Actually, this paper was concerned with the relationship between artificial intelligence applications and their ability to develop technical and administrative processes in libraries of Knowledge Management.

## 9. Analysis of Previous Studies

The world has now witnessed many technological changes, affecting the lives of everyone and institutions, and is no longer limited to a specific group, but accompanied everyone, even the finger of the era in which we are now living in the age of technology, as a result of what the world has witnessed in terms of explosion and huge information inflation, so it is necessary to keep pace with and keep abreast. This change is because it has a great benefit that serves everyone.

In light of this great information inflation, we find many applications that appeared and facilitated the operations, and libraries had a share in that, being a huge educational environment that includes a great knowledge momentum and serves large communities in various fields, and among these applications appeared artificial intelligence applications that contributed to the facilitation of operations in both technical and administrative libraries. [23] asserts that at the beginning of the third millennium, a discussion arose about the importance of the presence of technology in knowledge in general and in libraries in particular, as the computer and the Internet are among the priorities of education and cognitive attention that was found specifically for management and organization in libraries and information centers.

McCarthy [20] study indicated that artificial intelligence appeared as a term for the first time in 1956, to give the start and defined it as "It is the science and engineering of making intelligent machines". Years later, he modified his definition to become more relevant to smart computer programs, noting that "Artificial intelligence is the science and engineering of making smart machines, especially smart computer programs."

So, the artificial intelligence refers to a group of new methods and methods in programming accounting systems that can be used to develop systems that simulate some elements of human intelligence with intelligence.

Bamfleh [12] asserts that as an attempt to materialize human intelligence to produce machines, software and applications with capabilities that simulate human capabilities. The definitions included in Arab and foreign intellectual production as a result of the basis of this application and its development.

As it is evident through the published intellectual output that there is great and wide interest in publishing and studying the applications of artificial intelligence in various fields, including libraries and information centers, and in this chapter, previous studies will be discussed in line with the objectives of the current study

The issue of artificial intelligence is one of the relatively recent topics in the field of technology, despite the research conducted on the culture of the organization, but it still needs a lot of research and studies, as well as the need to delve into it by addressing its elements in some detail

### 9.1. Identify the Reality of Employing Artificial Intelligence Applications in Libraries to Enrich the Knowledge Management

The review of previous studies in the field of the reality of the use of artificial intelligence applications in libraries gives the researcher a great basic knowledge and base in the extent to which libraries and information centers are directed to this new technological application, which gives the library a deeper, stronger and easier benefit in providing information to the beneficiaries, as the branches and fields of artificial intelligence vary especially with regard to libraries and their associated information retrieval in machine learning, expert systems, and robots.

On the use of artificial intelligence applications in Sudanese libraries, especially in the reference service for libraries, given that university libraries in Sudan suffer from the problem of responding to inquiries, and other library departments do not pay attention to the importance of the presence of technology to facilitate library operations. The study used the descriptive and analytical approach, and used the checklist and interview, and through what it found, it suggested an easy application of this service for the auditors in the reference service, that created an application of a container from an expert system to build a specialized knowledge base for reference sources for medical diagnosis. In her study, she also explained how the referring specialist can convert the beneficiaries' questions into retrieval rules for easy use by the beneficiaries, especially for medical, health and nursing students. She also approved a study that he conducted [11] on the use of search engines for databases for a random sample of 80 female students of the Faculty of Arts. And it showed them a great

awareness of using this technology and a great knowledge of benefiting from this service.

In another study by [8], its findings on the realism of application and use of expert systems for artificial intelligence coincide with a generic study (1993) he made on the use of a knowledge-based knowledge base, and the user interface, in addition to the mechanism of inference or inference (Engine Inference).

Many libraries provided an appropriate combination with an identifier to use RFID technology, and the library's bibliographic records data to retrieve information from the repository and thus have the ability to deliver the book to the beneficiary who requested it, this is confirmed by [16] as the library is capable and has techniques that require the presence of intelligence software. It is hoped from the results of this study that there is a great expectation of the increasing use of technology in libraries, especially in the routine operations and the provision of appropriate services to the beneficiaries.

There was also talk about Google and the possibility of its applications in the field of artificial intelligence and what serves libraries in machine learning, and expert systems. The study dealt with the possibility of retrieving information to provide benefits and benefits to the beneficiaries. This supportive company for this field was chosen and its strong competition among its counterparts from companies, it is able to Meet the needs of libraries and the applications.

The use of artificial intelligence applications in libraries aims to simulate human thought and style, and it also manages new ideas that lead to innovation for the operations needed by libraries, and this is confirmed by another study by [4] in discussing the role and existence of information. In applications capable of developing and designing them in a way

It is easy for the beneficiaries to refer to it and what they need, so I used the descriptive, analytical and experimental approach in applying smart programs to see their ability to retrieve information.

"I am the robot, I found to help you, librarian" A study conducted by [13] aimed at identifying the importance of robots for the librarian, conducted as an exploratory study on a number of academic libraries in eighteen countries, nine European countries, and nine Asian countries as well. And I found that robots provide many services to libraries, some of them are simple and others are complex in the services it provides, and the respondents had differing opinions in calling for the existence of such expert systems in libraries, while others are afraid or perhaps pessimistic about their existence.

In another study, I reached a different conclusion about the reality of using artificial intelligence applications in libraries, where the researcher found results that there is no use of expert systems for artificial intelligence and there is no planning for their

use, and indications of the reasons for that centered around the lack of familiarity with the employees with them, and the lack of sufficient experience to work. To manage and develop it in the future [12]. The study recommended the need to pay attention to those in libraries because of the effectiveness and efficiency they achieve in providing information services.

## **9.2. Exposing the Relationship Between Artificial Intelligence Applications and Its Ability to Develop Technical and Administrative Processes in Libraries for Knowledge Management**

In a study conducted on the applications of artificial intelligence to expert systems in the provisioning service, where the study relied on the language (VBA) through the program (Access 2003), which consists of a knowledge base, a database and an automatic interface, and the study reached a set of results. The most important of which is that libraries in Sudan in those years were in their early stages, due to the lack of great interest of the library administrations with this technology, and they recommend the necessity of teaching courses that serve this field of application while working on holding training workshops to make the most of these experiences. The study [18] also indicated attempts in the field of acquisitions and group development, as it illustrated a design experience for expert systems that help in selecting the appropriate resource for sources of information. It also contributes to the evaluation through data of appropriate fields for the supply base that helps each publisher and resource to include a relationship with libraries, to clarify the number of Orders, supply orders, and delivery services.

Abdel-Hadi [3] also focused on talking about an experimental approach to expert systems in reference service and their application at the Information Center Library for support and decision-making, as he used the pre and post experimentation of the system that he designed and applied, and measuring the system's efficiency for this applied service. This is confirmed by the study [18] in designing a system whose function is to direct readers to various sources of information that suit their needs in the absence of a reference specialist. Perhaps the results he referred to are somewhat consistent with previous studies, as he found weakness in the services provided, and the lack of capable human competencies to manage these new systems, and came up with a set of recommendations that center around interest in continuous training and intense focus on modern technologies and practice in their use.

In [5] a practical application was designed for an expert system that was implemented on a microcomputer for a knowledge base that includes bibliographic information that includes all reference sources, so that the beneficiaries can refer to the

reference source that covers their field of interest without relying on the reference specialist, so the study used a special container. For the information of the medical field called (Geni), and (Prolog) language was used to collect the bibliographic cards for reference sources in university libraries in the medical field, and a special information retrieval strategy was developed that could direct the beneficiaries to choose and define the databases that fit their information needs [18].

In the field of direct indexes, a study conducted by [3] was suggested. The researcher proposed an expert system that works on indexes to develop the objective research of researchers, and the inferential construction of objectivity indexes based on the list of subject headings at the Library of Congress (LCSH). The study found many difficulties centered around the established terminology and their difficulty in matching and matching the terms used in the search in direct indexes, and also in using the expansion and narrowing feature in the search process, and the study suggested designing an interface to help the beneficiaries to use the appropriate subjective searches to conduct automatic searches in the natural language. And rely on sophisticated thesaurus.

When talking about the existence and operation of such libraries, it is natural to wonder about what will this proposed application serve as a new environment for work, and what is the goal that the library seeks to achieve, this is confirmed by [16].

About libraries, data and the fourth industrial revolution in which we discussed the new impressions of robots and artificial intelligence as a new technology gradually entering our lives and applying it in institutions, which described a change and a new reality to make a change in services.

In 1967, the first expert system was applied in the field of reference service and responding to the inquiries of the beneficiaries, and in 1972 another expert system was applied in the supply service in libraries, and in 1977 it was in the extraction service, and in 1983 in the detection services. These previous historical years in the use and activation of these expert systems and smart applications, it undoubtedly gives a future based on the introduction of previous experiences and practices in this field [6].

Designing a Model for an Expert System in References for the University of Khartoum Library, as it relied on applying the experimental applied approach and case study methodology, using various tools such as the interview and checklist, as well as the expert system container (Mini). KSR Tool), in order to be tested when designing and building the proposed expert system in the reference service to serve the response to reference inquiries. She also explained that by setting up a record prepared in a manner that helps the reference specialist to record questions and reference inquiries, to form a large and huge knowledge base that helps to obtain answers to similar

inquiries, and thus includes in expert systems to automatically respond to the inquiries of the beneficiaries. From the above, the researcher discussed the basic steps for doing this through the reference interview, drawing a map of the question and placing it in the framework of the appropriate response to it. The required hardware for the application is reported

In addition, they need: knowledge engineers, expert reference service providers, librarians, devices and equipment for expert system development, programmers and system designers.

The beneficial ways of using and investing in artificial intelligence applications and how they can be employed, as this can only be done with the presence of specialists who have sufficient experience, necessary skills and accurate knowledge of the needs of the beneficiaries, this is what finds proper employment to facilitate business and improve the quality of services and technological expertise.

When talking about the principles for the selection and evaluation of expert systems, a study was recommended by (Muthy and Cole) to find out appropriate databases and information to determine the appropriate when selecting expert systems, as it focused on the use of recall metrics

Accuracy and indicators to measure the beneficiaries' satisfaction, the application that will be applied in the office, then measuring the system's ability to perform and knowing how it benefits from that, as the study worked on responses by the beneficiaries to direct a number of objective questions when searching for appropriate sources for their performance according to the specific research questions. Analyze data using standard deviation.

There are some examples of using the artificial intelligent systems in the library like AuRoSS Rebor in Figure 1, it is an automated shelving system that was developed in Singapore.



Figure 1. The Robert AuRoS.

Also the Robot Nao in the Figure 2 that presented by Westport Library in America which teaches the children computer programming skills with the ability to speak different languages.





Figure 2. The robot nao.

### 9.3. Knowing the Challenges Facing the Libraries to Apply The Artificial Intelligence Applications

It is no secret that the use of technology and smart machines relieves people of many risks and pressures when doing work that requires extensive experience and great adequacy, but as we know that the presence of technology may facilitate operations and at the same time it is in itself a double-edged sword that faces many challenges, There are many challenges that prevent the use of artificial intelligence services and what is related to them, and among the most prominent challenges is the lack of qualified material and human equipment, which reflects the lack of acceptance of artificial intelligence technology [11].

Another study indicated the causes and challenges centered around the employees 'lack of familiarity with them, and the lack of sufficient experience to work on managing and developing them in the future [12]. When using these applications, some studies indicated the necessity of the rights of publishers or technology owners as a solution to face the challenges that serve proprietary data. And open to beneficiaries, and this is confirmed by a study [16].

The study of [11] also recommended the need to raise awareness for students about the correct and effective use of available networks and databases that accompany artificial intelligence.

As a summary of the opinions of the studies that have been discussed about the challenges that libraries face in applying artificial intelligence: the weakness of qualified material and human equipment, lack of familiarity with the staff with it, and the lack of sufficient experience to work on managing and developing it in the future, and as appropriate solutions to these challenges: Increasing awareness of students about the correct and effective use Available networks and databases that keep pace with artificial intelligence.

## 10. A Summary of The Previous Studies

When reviewing the intellectual production that are published about this new application, the researcher found that there is an application and a lot of abundance for it in various Arab and foreign studies, this means the interest of institutions to develop and keep pace with the waves of technology that facilitate the technical and administrative processes that they need.

The researcher came up with a set of conclusions, the most important of which are:

- The existence of an abundance and There are a lot of libraries that apply artificial intelligence technology in their services, whether technical in the provision of services, references and others, which undoubtedly facilitated the ease of retrieval and search for the beneficiaries.
- The available studies discussed various aspects of the reality that this new application plays in facilitating library services, and most studies agree on that to facilitate services and their quality. It also discussed the most prominent services that can be used in the application of artificial intelligence to facilitate the provision of the service, and also explained to us the challenges that libraries may face in implementing this and what solutions can be followed to avoid them, and work to manage and develop them.
- The application of artificial intelligence requires the availability of a set of basic ingredients and requirements, such as strong technical equipment, and qualified human resources capable of using and developing this technology as mentioned in this Table 1.

Table 1. The potential of artificial intelligence in the knowledge management system.

	<b>The potential of artificial intelligence in the knowledge management system</b>
<b>Material resource management</b>	- Track the movement of sources in the shelves - Track the status of sources (borrow, returns, technical operations)
<b>Human Resource Management</b>	- Calculate the number of visitors and their movements - Direct them to the resources they need
<b>Monitor the library environment</b>	- Lighting activation in case if the users inside the libraries - Feeling the presence of dangers in the library such as fires and others

## 11. Conclusions and Recommendations

This study that you have in your hands which is covered the reality of using artificial intelligence applications to develop technical and administrative processes in libraries, and included 3 chapters that able the libraries to apply and employ artificial intelligence

in Omani libraries after touching and knowing the experiences of other libraries in the application of this aspect that the study dealt with, and it comes out with results that contribute to adding new and developing proposals suitable for libraries.

With this amazing endless acceleration witnessed by technology, communication and knowledge sharing technologies in various fields of life, it became necessary for libraries and information centers to keep pace with these changes so that they can perform their tasks and services quickly and effectively.

Working in artificial intelligence applications will generate knowledge and invest it in an optimal investment, thus facilitating the provision of services to the beneficiaries.

## 12. The Study Recommendations:

- The necessity for libraries and information centers to strive to keep pace with the changes of artificial intelligence and to make the right investment.
- Increasing field studies to explore the requirements of artificial intelligence technologies.
- Diversity in the services provided by artificial intelligence in the library and activating them effectively.

## References

- [1] Al-Atoum N., University libraries, 2020.
- [2] Abdel-Hadi Z., "Introduction to an expert system who conducts objective searches in online indexes", *Journal of Modern Trends for Library and Information*, vol. 7, pp. 159-182, 1997.
- [3] Abdel-Hadi Z., "Artificial Intelligence and Expert Systems in Libraries: An Experimental Introduction to Expert Systems in the Field of References by Application to the Library of the Information Center and Decision Making Support, Presidency of the Council of Ministers of Egypt," Master Thesis, Cairo University, 1995.
- [4] Abdel-Jawad S., "Smart Agent Software Applications in Information Services: A Comparative Study," Published PhD Thesis, Menoufia University, 2006.
- [5] Abdul-Razzaq A., "Applications of Expert Systems in The Field of Information and Libraries," in *Proceedings of 3<sup>rd</sup> scientific Symposium on Information Institutions in The Arab World, Their Present And Future*, Amman, pp. 101-122, 1993.
- [6] Al-Hassan A., "Expert Systems and Their Applications in Libraries and Information Sciences: Reviewing Arab Production By Authorship and Translation, Analytical Approach [Research Presented.]," in *Proceedings of The Twentieth Conference: Towards A New Generation of Information Systems and Specialists-A Future Vision: The Arab Federation for Libraries and Information and The Moroccan Ministry Of Culture*, Casablanca, pp. 415-443, 2009.
- [7] Al-Fatihy Y., "Artificial Intelligence and Expert Systems Applications in Libraries: A Model Acquisition-Expert System," Unpublished PhD Thesis, Al-Neelain University, 2008.
- [8] Al-Maliki M., "Expert Systems and Their Applications in Libraries and Information Centers," *Al-Faisal Magazine*, vol. 317, pp. 23-29, 2003.
- [9] Al-Ratibi M., "Artificial Intelligence and the International Information Network the Internet, in Applications of Artificial Intelligence," Arab Administrative Development Organization, 2009.
- [10] AL-Suqri M., "*Information Needs and Seeking Behavior of Social Science Scholar at Sultan Qaboos University in Oman: Amixed- method approach*" (Unpublished doctoral dissertation), Emporia State University, Emporia, 2007.
- [11] Al-Qarni A., "The Effect of Using Automated Search Engines on The Use of Databases," *King Fahd National Library Journal*, vol. 13, no. 1, pp. 5-75, 2007.
- [12] Bamfleh F., "Expert Systems Technology: its Concepts and Applications with A Survey on its Use in Jeddah Libraries," *Journal of King Fahd National Library*, vol. 5, no. 2, pp. 41-62, 2000.
- [13] Chakarova J., I-Robot, to help You-Librarian. Robots in Libraries: Challenge or Opportunity, Wildau University in Germany, 2019.
- [14] Clarke V., "Thematic analysis," *The Journal of Positive Psychology*, vol. 12, no. 3, pp. 297-298, 2017.
- [15] Gholy A., "Expert Systems (Artificial Intelligence) and Their Potential for Use in Libraries and Information Centers," *Informatics Journal Ministry of Education-Agency for Development and Planning*, vol. 8, pp. 6-8, 2005.
- [16] Halawani A., "Libraries, Data and the Fourth Industrial Revolution," *Journal of Information Studies: Saudi Library and Information Association*, vol. 18, pp. 176-169, 2017.
- [17] Johnson R. and Turner L., "Toward A Definition of Mixed Methods Research," *Journal of mixed methods research*, vol. 1, no. 2, pp. 112-133, 2007.
- [18] Lancaster F. and Al-Shaleel T., "Applications of Artificial Intelligence Technologies and Expert Systems in Library Applications and Information Services," *King Fahd National Library Journal*, vol. 14, no. 2, pp. 394-400, 2008.
- [19] Ma W. and Cole T., "The Test and Evaluation of an Electronic Database: Selction Expert System," Association of College and Research Libraries, 2001.

- [20] McCarthy J., "What is Artificial Intelligence?", 2007.
- [21] Peaceful A., "Artificial Intelligence Applications to Retrieve Information in Google," *Journal of Information Studies Saudi Library and Information Association*, vol. 9, pp. 103-124, 2017.
- [22] Qandilji A., *Scientific Research and the Use of Traditional and Electronic Information Sources*, Dar Al-Yazouri, 2010.
- [23] Saleh O., "Tools for Collecting Data and Information in The Field Study," Algeria University of Ghardaia, 2018.
- [24] Sardouk A., "The use of Smart Robots in University Libraries: Global Experiences and Current Reality in the Countries of the Maghreb," *Journal of Information and Technology Studies*, vol. 2, no. 10, pp. 1-15, 2020.

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