

Full Length Research Paper

Role of knowledge repositories in storing the knowledge

Mohammed Saleh Altowairqi and Alhobibi Mubarke Alqahtani

Information science, King Abdulaziz University, Saudi Arabia.

Abstract

Accepted 24 December, 2022

Knowledge is seen as a number one supply of emolument introduced in an association. Though, knowledge is dispensed disproportionately in most of the cases. Knowledge is not an object which can be preserved in conventional methods like file systems. The knowledge should be stored in that way where the administrator or the users can access them whenever they need or from wherever, that must be the first feature of the knowledge repositories. The knowledge repositories are the place where the humans can store their acquired knowledge digitally. The knowledge repositories provide a provision to create, store and access the knowledge from everywhere through the internet. The maintained knowledge repositories will have the features like limited access, proper content management, record or data management, centralization, and cost effectiveness. All these features are explained in this study. The objective of the study is to collect the detailed information about the knowledge repositories, like; how the knowledge repositories are created? Why do people or any enterprise need knowledge repositories? And a lot more are briefly described in this study. The descriptive algorithm is used to encounter the results from the data. The existing research is taken as the input data or the initial data, in which the author has to go through the resources completely to demystify how the knowledge repositories impact the process of knowledge storing. As a result, the author has compared the research based on the motive of the study, findings of the researchers, results from the implementations, the possibility of usage of the research in future and the techniques and algorithms used.

Keywords: Knowledge, knowledge repository, machine learning, descriptive algorithm.

1. INTRODUCTION

How does the data are stored in conventional file systems? Was it an efficient way? No. The file system had no protection or a proper audit system. But a database can be more efficient compared to the conventional file system. With time the technology will grow along with the attacks and attackers, so the digital world must be digitally protected from such groups of people [17]. The knowledge repository can be defined as an online database which can categorize, organize and capture systematically knowledge based information. They are generally known to be a private database. Knowledge repositories assist companies to join humans with data and understanding universally thru on-line discussion boards, searchable libraries and different elements. They offer a crucial area to accumulate, make contributions and share

virtual learning sources to be used in educational layout and content material improvement for each conventional and non-conventional learning atmosphere. They have ended up in a critical part of corporate extensive understanding control applications and a treasured stimulation of social and casual learning activities.

Companies can leverage either property-based or knowledge-based resources. A firm owns and is entitled to legal protection for property-based resources, such as contracts and patents. The definition of knowledge-based resources (KBRs) includes intangible knowledge held by personnel that contributes to a company's competitive advantage. Technical, creative, and collaborative abilities are only a few examples of the particular talents that KBRs appear to be, and these skills are directly related to integrating and coordinating interdisciplinary cooperation. Previous studies have shown that KBRs have a beneficial impact on return on sales, operational profit, and market share. Further research has shown that KBRs support many forms of innovation relating to activity coordination, external collaborations, business processes and procedures, and personnel skill sets. In terms

of service delivery approaches, product innovation, and organizational innovation, KBRs are also stated to support innovation [23, 24].

The figure – 1 is the illustration of the working of the knowledge repositories using machine learning algorithms such as Support vector machines, Neural networks, Clustering algorithms, Naive Bayes, Genetic algorithms, Explanation-based learning, Decision tree learning, Instance-based learning, Reinforcement-based learning, Associative Rules, and Recommender algorithms [8].

The knowledge repository cannot work alone, when it works alone it will work as a simple data base but when it has a combination of machine learning algorithms it can produce incomparable performance [11]. The knowledge repository working structure or strategy or the system basically consists of five different steps like: Collecting the input data, processing that obtained input data using knowledge based learning algorithms, those algorithms have a capability to identify flags and data patterns from the process. The knowledge learning accesses the user data from the previous process from the knowledge repository such as DBMS or NoSQL in association with machine learning algorithms. Then in the next step the data is processed by hypothesis and predictive mining procedures, this output data is then sent to a knowledge repository as a set of data or a collection along with metadata, finally the output is further taken for presentation and analysis according to the users' needs [7].

1.1 Knowledge Repositories

Knowledge repositories are on-line records that constantly acquire and arrange an establishment or a company's or an enterprise's information assets. These also are called "knowledge management repositories". The five features of an efficient knowledge repositories:

- **Limited access:** By limiting person content material portions thru password authentication, biometric authentication and other different safety functionality, curators can achieve numerous targets. Limiting access regularly contains safeguarding trademarked data and shielding confidential assets. Some, however now no longer all, repositories hire DRM (digital rights management) to guard and monetize confidential assets within the marketplace.

- **Cost effective:** Knowledge repositories can doubtlessly lessen the price of education and training through making less costly route substances manageable, decreasing the requirement of lecture room education and thought-provoking efficient casual learning [6].

- **Centralization:** An efficient knowledge repository would have a global interface. When it is connected globally it is easier to work combinedly, people and employees can access and store or work on the repositories from anywhere around the world through internet access. When it has given such wide access it must be capable of holding on the key factor called confidentiality.

- **Content management:** The extensiveness of getting to know content material that can consist of visual files, data, audio files, simulations, articles, learning modules, YouTube videos, blogs, satisfactory practices guidance, tracking skills and speaking to information. Content is searchable with the

aid of using keywords, getting to know outcomes, and different vehicles [10].

- **Record or data management:** This is the action of keeping, collecting, and the usage of records efficiently, cost-effectively, and securely. Records management is described as an area of control liable for the effective and systematic management of the maintenance, creation, use receipt, and temperament of archives, such as approaches for apprehending, and preserving proof of and data about commercial enterprise actions and dealings within the records [14].

1.2 Storing knowledge using knowledge repositories

Predict stock rates, google robot driven vehicles, IBM Watson, Yelp ratings, Genome classifications, Stream Analytics, astronomical data analysis, Amazon recommendation engine, human speech recognition, electronic trading fraud and lot more are the real time implementations of knowledge repository and machine learning [2]. The repositories are defined as a database or a structured list which permits the files and other documents to be retrieved, stored and searched for. A knowledge capture process needs an area to store the collected data. The repository can be considered as such an area where the data is collected and stored [9]. This repository does not just store the data but it also has the provision to store and retrieve data from this. It can be considered as a list or a database or a library of the document which is enclosed with the tools such as team space, intranet site, Microsoft Share point and portal. A project database can be considered as an example when it permits to capture important data of all the projects, customer support knowledge data base which has a capability to capture proposal libraries and problem resolutions which helps to create customer proposals[15].

2. LITERATURE REVIEW

A few researchers have stated the significance of getting a method that combines knowledge storage and knowledge sharing in a few remote explanations. The literatures about the knowledge storage and knowledge sharing have in large part advanced self-sufficiently of every other. Most of the research noted appear to have unconsciously or consciously not connected with knowledge storage and knowledge sharing. Nevertheless, some research that absolutely occurs are a few remote explanations of the importance of getting the interplay among knowledge storage and knowledge sharing. For example, factor out that the simple life of information everywhere in a business enterprise is of diminutive advantage which would turns into a necessitated company advantage simplest while it's far stored and reachable, its cost will increase with the extent of its availability[1].

Corresponding to this, another researcher shows that the occurrence of use of an establishment's knowledge may be carried out as a pointer of the efficiency of knowledge storing. In equivalent with it, feedback was given as "knowledge which is within the head of someone has constrained worth, even as the worth of knowledge can boom drastically while it's far reused, networked and stored, and fast incorporated into

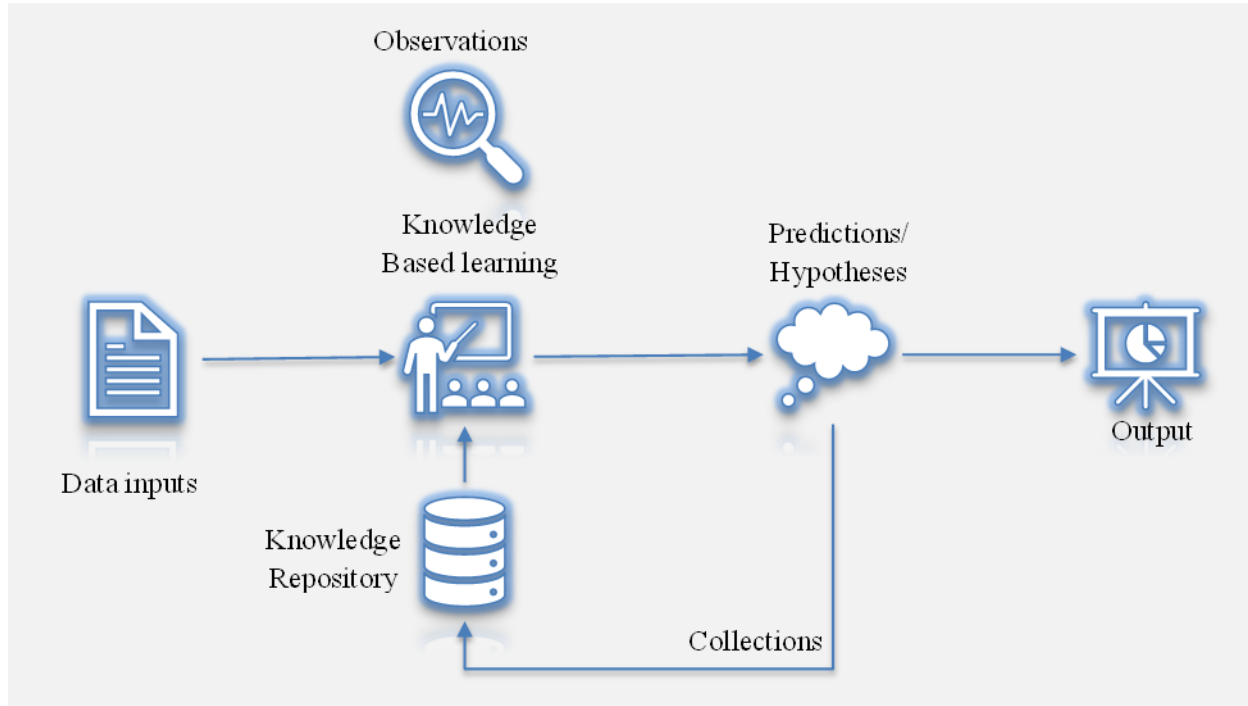


Figure 1. Overview of Knowledge repository.

enterprise processes and practices”. Contrary to this view, later a study had a look at that numerous corporations are determined to the growth of knowledge sharing concept amongst their personnel thru the introduction of a ‘knowledge repository’ or database. Nevertheless, an awful lot of the primary literature indicates that ICTs (Information and Communication Technologies) ought to play a valuable position within the “knowledge transfer” of an establishment. Establishments have grown to become ICT as an allowing apparatus to vending their “knowledge sharing activities” [13]. A systematic review of knowledge management was put forward by Abdalla in 2021, The fundamental dynamics of knowledge management are examined in their study, as well as the necessity of successfully implementing KM tactics in the context of smart cities. The majority of the conclusions were based on a careful assessment of the literature. It discusses knowledge management (KM) and smart cities. Their research comes to the conclusion that the generation, utilization, and management of knowledge in smart cities has a substantial impact on the growth of smart cities. As a result, knowledge generated by the creation of smart cities shall be used and managed by smart cities governance [21].

3. RESEARCH METHODOLOGY

Descriptive research targets as it should be and methodically define an observation, state of affairs or singularity [5]. It can solve the while, where, what, and the way of questions, however now no longer why questions exist. A descriptive research layout can use an extensive kind of studies techniques to analyze one or greater variables. Unlike in tentative studies, the researcher no longer manipulate or

manages any of the variables, however best measures and observes them. Descriptive research is normally described as a kind of quantitative studies, nevertheless qualitative studies also can be used for descriptive determinations [3]. The studies layout has to be cautiously advanced to make certain that the effects are reliable and legitimate. Survey studies let in to acquire big capacities of records that may be examined for patterns, frequencies, and averages. Common makes use of surveys include:

- Exploring the existing studies, researches, publications and books.
- Selection of needed abstracts
- Accessing the complete papers through different portals
- Learning the complete papers
- Filtering and categorizing them to different sections like findings, scope, algorithm and so on.

This study implements a systematic review of the literature of the knowledge repositories. According to the study of Patel (2020), the research summarizes the previous studies related to COVID-19. And their research objective was to form a better determination or understanding of influencing factors of COVID-19 globally on the pediatric population. They used Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines to obtain the perception of epidemiology of pediatric COVID-19. They focused on Pediatric Coronavirus 19, Pediatric Covid-19, and Pediatric SARS-COV-2, specific articles were sought for using the Google Scholar and PubMed databases. The included papers' references were examined. Data on clinical, laboratory, demographics, outcome variables, radiographic, and therapy were examined for all papers that satisfied the criteria [19]. Similarly, next year

Table 1. Summarization of researches.

	Article	Objective	Algorithm/ techniques/ tools	Findings/results	Scope
1	Knowledge Management System using CORE Repository	To create a knowledge base using connecting repositories	Priority logic, CORE database and query	Bibtex format results were generated to connect with records relevant to the local database.	The developed interface can be used in future to access individual resources if the text mining policies are updated.
2	Application of Knowledge Repository and Mapping in Knowledge Management	To learn about the concept of knowledge repositories and the uses of knowledge repositories.	Decision Support System, knowledge maps; mind map, descriptive map, Concept map, Normative map, and Prescriptive map	Has a deep explanation about Knowledge repositories and its various applications along with the concepts of knowledge mapping, stages of mapping and their types.	It can be used to link between the learning pathways and different concepts that enhance future collaboration and learning.
3	Can a Computer-based Knowledge Repository Strengthen Organizational Memory? Evidence from a Japanese Company	To look at whether or not a computer-based knowledge repository can develop an organizational reminiscence by gaining knowledge of failure.	Questionnaire survey	digital repository now no longer develops an organizational reminiscence directly, mediated thru augmentation of each smooth and difficult reminiscence inclusive of mind reminiscence and files respectively and the smooth and difficult reminiscences increases the organizational reminiscence.	The organizational recurring of utilizing a computer system might also additionally improve organizational memory.
4	Storage of Transferred Knowledge or Transfer of Stored Knowledge: Which Direction? If Both, Then How?	To prove that the distributed knowledge must be incorporated thru knowledge storing technique and sharing into knowledge repositories for future use.	Knowledge transfer mechanisms	The implementation of a complete and incorporated technique that helps the linking of knowledge storing and sharing through technological and social networks, while growing a context for a proper success of knowledge sharing.	In the rising knowledge-based civilization, an administration's expertise is regarded as the primary supply of its challenging benefit and knowledge sharing is extensively emphasized as a strategic difficulty for its challenging benefit.
5	Knowledge-based repository scheme for storing and retrieving business components: a theoretical design and an empirical analysis		Component-based development	The proposed structure is applied in a prototype repository. The underlying type, prototype efficiency and coding scheme is classified analytically via achieved trials.	In the next era the results can help the statement that the structure is powerful in improving the analyst and user capacity to discover the wanted commercial enterprise components.

the study [20] came up with a systematic review of literature on gamification in science education. 24 empirical research articles published between 2012 and 2020 in various electronic databases and the academic online search engine Google Scholar underwent a thorough examination of the literature to reveal the latest trends of gamification in science education. The precise procedure that was followed includes the actions such as, setting forward research questions, investigating databases, the inclusion/exclusion standards, choosing studies, data analysis and extraction, conclusion and analysis of the data and reporting the review [20].

4. RESULTS AND DISCUSSIONS

Observations and results let authors collect records on phenomena and behaviors while not having to depend on the accuracy and honesty of respondents. This approach is frequently utilized by marketplace, social and psychological researchers to recognize how humans act in real-existence circumstances [12]. Following a review and analysis of the literature, we also present the findings of our cutting-edge analysis, talk about the current status and constraints of research and practice, and offer helpful insights on this significant and difficult subject [25].

It goes without saying that providing medical treatment makes considerable use of scientific knowledge and also adds to it. While providing healthcare, scientific labor procedures and the individuals who produce scientific knowledge sometimes remain somewhat in the background. Therefore, it is less obvious that changes in biomedical scientific practices, particularly those that affect its stakeholders, techniques, and equipment, also have a significant impact on how healthcare is structured and delivered. The so-called knowledge repositories, or bio-banks, are at the center of this digital transition. These days, high-throughput analytical technologies are used to create biological data at such a quick rate and on such a large scale that they can no longer be shared through the traditional, well-established route of academic publication. Nobody can stay on top of the most recent developments. Additionally, preserving scientific data on paper makes it challenging to integrate all of the discoveries, and it is precisely in the creation of such combinations that the data revolution holds promise. Many individuals now believe that the advent of data-centric research heralds the need for data to be "liberated" from their confinement on paper and kept in the cloud. Only there can the bigger, more comprehensive image be seen [18, 22].

5. CONCLUSION

Knowledge is sent disproportionately in any field. The truth is that knowledge sharing inside an employer or among businesses has turned out to be a hotly debated subject matter inside records and knowledge management literature. As a conclusion, the research was about the role of knowledge repositories in storing the knowledge [4]. The study envelopes with the explanation of how the knowledge repositories help to store the data in an efficient way. As a suggestion, knowledge repositories and information systems need to be explored by the researchers using network

analysis methods and identify its pertinence in the administrative background. And the argument is that, the most important developments can be made in association research and theory by reconnoitering these concepts and topics.

Moreover, additional research is compulsory to completely comprehend the implication, scope and limitation of this research in an association background. Industries have the possibility to increase numerous assistance from including social media into their knowledge sharing activities. In directive to take advantage of that probable, further research into problems of trust information purposes, and actual knowledge sharing should be observed. This research can provide establishments the capability to improve the understanding of advantages from association of intellectual and technologies and the social and capital they can generate[16].

REFERENCES

- [1] Gray, Peter H. "The impact of knowledge repositories on power and control in the workplace." *Information Technology & People* (2001).
- [2] Kankanhalli, Atreyi, Bernard CY Tan, and Kwok-Kee Wei. "Contributing knowledge to electronic knowledge repositories: An empirical investigation." *MIS quarterly* (2005): 113-143.
- [3] Gray, P. H., and Chan, Y. E., Integrating knowledge management practices through a Problem-solving framework, Queen's University at Kingdom, Canada, Queen's Centre for Knowledge-Based Enterprises, Working Paper WP 00-03, 2000, pp. 1-17.
- [4] Kankanhalli, Atreyi, Bernard CY Tan, and Kwok-Kee Wei. "Understanding seeking from electronic knowledge repositories: An empirical study." *Journal of the American Society for Information Science and Technology* 56.11 (2005): 1156-1166.
- [5] Zagzebski, Linda. "What is knowledge?." *The Blackwell guide to epistemology* (2017): 92-116.
- [6] Leonard, Dorothy. *Wellsprings of knowledge*. Boston: Harvard business school press, 1995.
- [7] Nonaka, Ikujiro, and Hirotaka Takeuchi. "The knowledge-creating company." *Harvard business review* 85.7/8 (2007): 162.
- [8] Coakes, Elayne. "Storing and sharing knowledge: Supporting the management of knowledge made explicit in transnational organisations." *The Learning Organization* (2006).
- [9] S. M. Jasimuddin, J. H. Klein, and C. Connell, "The paradox of using tacit and explicit knowledge: strategies to face dilemmas, Proceedings CD (ISBN: 1-84469-066- 7), 6th International Conference on the Dynamic of Strategy, (one of the 12 Best Papers) Surrey, June 2004.
- [10] Hicks, Ben J., et al. "A framework for the requirements of capturing, storing and reusing information and knowledge in engineering design." *International journal of information management* 22.4 (2002): 263-280.
- [11] Jasimuddin, Sajjad M., and Zuopeng Zhang. "Transferring stored knowledge and storing transferred
- [12]

knowledge." *Information Systems Management* 28.1 (2011): 84-94

[13] Robinson, Rachel. "Computationally networked urbanism and sensor-based big data applications in integrated smart city planning and management." *Geopolitics, History, and International Relations* 12.2 (2020): 44-50.

[14] W. M. Cohen, and D. A. Levinthal, "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, 35, 1990, pp. 128-152.

[15] Jasimuddin, Sajjad M., Nigel Connell, and Jonathan H. Klein. "Knowledge transfer frameworks: an extension incorporating knowledge repositories and knowledge administration." *Information Systems Journal* 22.3 (2012): 195-209.

[16] V. Albino, G. A. Claudio, and G. Schiuma, "Knowledge transfer and inter-firm-firm. relationships in industrial districts: the role of the leader firm". *Technovation*, 19, 1990, pp. 53-63.

[17] L. Argote, and P. Ingram, "Knowledge transfer: a basis for competitive advantage in firms". *Organizational Behavior and Human Decision Processes*, 82(1), 2000, pp. 150-169.

[18] R. M. Grant and C. Baden-Fuller, A knowledge-based theory of interfirm collaboration, In *Academy of Management Best Papers Proceedings*, 1995

[19] Swierstra, T., & Efstathiou, S. (2020). Knowledge repositories. In *digital knowledge we trust. Medicine, Health Care and Philosophy*, 23(4), 543-547.

[20] Patel, N. A. (2020). Pediatric COVID-19: Systematic review of the literature. *American journal of otolaryngology*, 41(5), 102573.

[21] Kalogiannakis, M., Papadakis, S., & Zourmpakis, A. I. (2021). Gamification in science education. A systematic review of the literature. *Education Sciences*, 11(1), 22.

[22] Abdalla, W., Renukappa, S., Suresh, S., & Al Nabt, S. (2021, December). Managing knowledge in the context of smart cities: a systematic review. *Academic Conferences International*.

[23] Wilkinson, Mark D., Michel Dumontier, Ij J. Aalbersberg, G. Appleton, M. Axton, A. Baak, N. Blomberg et al. "The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3: 160018." (2016).

[24] Ouriques, R., Wnuk, K., Gorschek, T., & Svensson, R. B. (2022). The role of knowledge-based resources in Agile Software Development contexts. *Journal of Systems and Software*, 111572.

[25] Anjaria, K. (2022). Dempster-shafer theory and linguistic intuitionistic fuzzy number-based framework for blending knowledge from knowledge repositories: An approach for knowledge management. *Expert Systems with Applications*, 199, 117142.

[26] Psarommatis, F., & May, G. (2022). A literature review and design methodology for digital twins in the era of zero defect manufacturing. *International Journal of Production Research*, 1-21.