

# Application and Trends in Information Management System using Artificial Intelligence

Abdulnaser S. H. Al-MSloun\*

*University of Jeddah, "College of Business -Al-kamil Branch", Jeddah, Saudi Arabia.*

**Abstract:** In the information era, the generation of data is attained from the diverse resources and the growth of technology has witnessed the data generation. The information acquired from diverse resource provide assistance in further decision making. Depends on the nature and quality of information, the acquired information is processed and the needed aspects are taken from the processed data. The processed data gives significant information, which makes the business and other industry to make effective decision. The proficient decisions are achieved by diverse approaches namely artificial intelligence (AI) and machine learning. The AIbased techniques process the information to acquire the needed insights and it also manages the information proficiently. The diverse source of data generation has different structure of data format that is complicated to handle and manage. To meet all these necessities, AI based approaches are initiated by the researchers. In this paper, AI based information management approaches and their application in diverse field is given. Also, comprehensive analysis of information management system by various author is reviewed.

**Keyword:** Artificial Intelligence, information management, decision making, IoT, B2B and big data.

## 1. INTRODUCTION

The information-based economy is evolving in the twenty-first century and with the improvement of the academic ideas on the lifelong learning perspective, the demand of community to the individual's information expertise stage and structure will be getting greater and higher. Information management is additionally turning into grater and greater importance in recent days. To acquire efficient and reliable information accurately and quickly, unstructured information has to be changed radically into the needed information and it passes this acquired information to those who want it at a suitable time, it is imperative to employ artificial intelligence for the management of information. This can effectively eliminate the manual process of information search, indexing, classification, and acquisition to recognize the automation of information management at a determined education system via using intelligent tools.

### 1.1. Information Management

At present, there is no unified description of data management, and the researchers have distinct definitions. The information management, as originally envisaged through educational institutions, which is a conceptual framework that is utilized by the organizations, people assume it is necessary to combine information and combine facts to permit them into information warehouse. At the same time, it addition-

nally gives information to random debris into the device to be capable to use the information of the strategy; the motive of this conversion is identical to develop the information [1].

Information management is a new way to prepare and progress the acquired information from diverse sources. Through tremendous information management, it helps the peoples to combine a range of easily accessible sources and with the assist of information tools; it makes easy information to emerge as greater precious information or knowledge. While the description of information management is distinctive at home and abroad. However, in reality, it is to assist people to enrich the work efficiently and integrate their sources of information and enrich their competitiveness.

Through the information management, readily accessible and a range of information of people will emerge as a greater knowledge. So, as to gain the appropriate work and life from the acquired and processed information. Information management utilizes the communicated information, technology, and computer to assist every individual to control the information effectively. An information management system is a framework to combine the information from diverse aspects, which is regarded as the most vital and will become a part of a person's information base by way of individual data. It gives an approach for processing the information which is scattered, random data can be transformed to the use of the device and the growth of personal data. It's the focal point on information and revolutionary ability. It's a technique of acquisition, identification, sharing, development, utilization, and assessment for knowledge [2].

\*Address correspondence to this author at the University of Jeddah, "College of Business -Al-kamil Branch", Jeddah, Saudi Arabia; E-mail: asalem2@uj.edu.sa

**1.2. Artificial Intelligence**

Artificial Intelligence is determined as machine intelligence and it employs artificial techniques to attain intelligence on a computer system. AI makes the machines behave like humans and stimulate the machines to intelligent [3]. AI is the wide restrain that is a combination and progression of linguistics, neurophysiology, computer science, psychology, information, and control theory. It is a complete technical and inter-discipline, which is correlated to psychology, information, biological, cognitive, and system science. AI has progressed excessive accomplishments on the expert system, pattern recognition, game, natural language processing, information processing, information database with intelligent robot, automatic programming, and theorem proving [4, 5].

AI is shaped as an extensive range of instruction of progression and now, the research on artificial intelligence usually elevate through three approaches as following:

- Utilizes the techniques of organic sciences to discover the intelligence of human nature.
- Utilizes the techniques of computer science. It makes use of the association concerned with the mechanism that is based on the construction of the network, utilizes the artificial neural network to pretend the image of human intellectual. This approach may want to resolve the Information which is tough to direct through the usage of symbols.
- Utilizes the techniques of physiology.

AI uses the above said approaches to learn the intelligence of humans and information is managed effectively.

The rest of the research paper is organized as follows: the complications of information management system is discussed in section 2, information management system in diverse applications and its trends are detailed in section 3, comprehensive analysis of information management is illustrated in section 4, and the information management system with AI is concluded in section 5.

**2. COMPLICATIONS IN THE INFORMATION MANAGEMENT SYSTEM**

The information generated from human beings is highly extensive. It is dispersed in special levels and areas. Information management confronted many challenges and the fast improvement of the Internet that carries limitless Information sharing. However, it brings additional problems and challenges in information processing through AI. According to Gartner Group report: "The Information explosion to create

it into such a difficulty: technological invention has extended the quantity of information and connectivity.

**2.1. The Complications of Information Overload**

People are in a fluctuating, open and competitive atmosphere. It is a very essential in accumulating the information efficiently and quickly. However, most of the information's are distributed in the e-mail, on-line news, web pages, and the infinite range of data make human sink in the deep ocean of information. Excess information overload lead to outlay extra time to gather, filtering of information, and the time have to be utilized for the evaluation of information and make a massive decision making system [6].

**2.2. The Complications of Unstructured Information**

Unstructured information accounts for most of the content of information and the key facts usually hides in the unstructured information's namely documents, e-mail, Web page. The process of classification, indexing and controlling the unstructured information, which is massive. It will meet each and every day problems and challenges that will make a great loss. Then, the maintenance of a clever insight is a complicated and discovering the risk as well as threat is not possible. The sharing of information and utilization is to generate a greater value [7, 8].

**2.3. The Complications of Tacit Information System**

Information can be categorized into two varieties: tacit and specific Information. Explicit Information can be specific and articulated with formal language, which can be exchanged and transferred. The tacit Information is constructed on the foundation of non-public experience, it is challenging to utilize the figures and language to specific to some exclusive range whereas it is tough to alternate and share. A necessary factor of Information management is the expression and acquisition of tacit Information. It permits men and women to make a contribution through their experience, ideas, tacit, skills, Information and then flip it into express Information that can be shared with others [9, 10].

**3. INFORMATION MANAGEMENT SYSTEM IN DIVERSE APPLICATIONS AND ITS TRENDS**

In this segment, some expressive data the executive's frameworks clarified in this paper as far as frameworks, upheld workloads, data model, lists, adaptation to internal failure, simultaneousness control, query handling and memory flood control technique in Table 1.

**Table 1. A comprehensive comparison of Memory Management Approaches.**

| Different Information Management System | System               | Workloads | Data Models | Indexes | Fault Tolerance                 | Concurrency Control               | Query Processing | Memory Overflow             |
|-----------------------------------------|----------------------|-----------|-------------|---------|---------------------------------|-----------------------------------|------------------|-----------------------------|
| Real Time Processing System             | Yahoo! S4 [11]       | Streaming | Event       | Hashing | Standby Server                  | Passing the message               | -                | -                           |
|                                         | Spark Streaming [12] | Streaming | RDD         | -       | Checkpoint, lineage and replica | Read and Write locking, partition | -                | Swapping at the Block Level |

|                           |                   |                            |                           |                                                      |                                               |                                                                                 |                           |                                                           |
|---------------------------|-------------------|----------------------------|---------------------------|------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------|
| Cache System              | Memc3[13]         | Object operations          | Key-value                 | Hashing                                              | -                                             | Optimistic locking and lock striping                                            | -                         | -                                                         |
|                           | Memcached[14]     | Object operations          | Key-value                 | Hashing                                              | -                                             | Locking with fine-grained approach                                              | -                         | -                                                         |
|                           | Txcached[15]      | OLTP                       | Key-value                 | Hashing                                              | -                                             | MVCC                                                                            | -                         | -                                                         |
| Big Data Analytics System | Spark/RDD[16]     | Analytics                  | RDD                       | -                                                    | Check point and lineage                       | Read and Write locking, partition                                               | Offline                   | Swapping at the block level                               |
|                           | M3R[17]           | Analytics                  | Key-value                 | -                                                    | -                                             | Locking and partition                                                           | Offline                   | -                                                         |
|                           | Piccolo[18]       | Analytics                  | Key-value                 | Hashing                                              | Check point                                   | Locking                                                                         | Offline                   | -                                                         |
| Relational Databases      | SAP HANA[19]      | OLAP and OLTP              | Text and Relational graph | CSB <sup>+</sup> -tree, inverted and timeline index, | GPFS, Standby server, logging and check point | 2PC and MVCC                                                                    | Graph model calculation   | Compression and swapping at the levels of partition/table |
|                           | Hyper/Scyper [20] | OLAP and OLTP              | Relational                | Balanced search tree, hashing and ART                | Replica, logging and checkpoint               | Serial execution for OLTP, virtual snapshot and strict timestamp ordering (STO) | Stored procedure and JIT  | Compression                                               |
|                           | H Store[21]       | OLTP                       | Relational (row)          | Binary tree, hashing and B <sup>+</sup> -tree        | Replica, command logging and checkpoint       | Light weight locking, partition serial execution and Speculative CC             | Stored procedure          | Anti-caching                                              |
|                           | Hekaton [22]      | OLTP                       | Relational (row)          | Bw tree and latch-free hashing                       | Replica, logging and checkpoint               | Optimistic MVCC                                                                 | Complied stored procedure | Project Siberia                                           |
| Graph Databases           | Trinity [23]      | Graph operations           | Graph                     | -                                                    | -                                             | Fine grained spin lock                                                          | Stored procedure          | -                                                         |
|                           | Bitsy [24]        | OLTP                       | Graph                     | -                                                    | -                                             | Optimistic concurrency control                                                  | Stored procedure          | -                                                         |
| NoSQL Databases           | Mongo DB [25]     | Object operation analytics | Document (bson)           | B-tree                                               | Memory mapped file                            | Locking at database level                                                       | -                         | -                                                         |
|                           | Redis [26]        | Object operation analytics | Key Value                 | Hashing                                              | Check point and logging                       | Single Threaded                                                                 | Scripting                 | Compression                                               |
|                           | RAMCloud [27]     | Object operation analytics | Key Value                 | Hashing                                              | Replica and logging                           | Fine grained locking                                                            | -                         | -                                                         |
|                           | MemepiC [28]      | Object operation analytics | Key Value                 | Skip list and hashing                                | Replica and logging                           | Virtual snapshot and atomic primitives                                          | JIT                       | User space VMM                                            |

### 3.1. Implication of AI in Business to Business (B2B), Internet of Things (IoT), and Big Data Management

Internet of Things (IoT) has received big significance due to its elasticity in incorporating communication technologies and smart gadgets for simplicity of carrier provisioning. IoT offerings depend on a dissimilar cloud community for serving person needs ubiquitously. Service in information man-

agement is complicated to undertake in the heterogeneous scenario due to arbitrary access and provider compositions. The machine learning aided information management system is projected for dealing with information to make sure the uninterrupted service for person request. The neural learning system gains control over provider attributes and response based on the information to unexpectedly assign assets to the inbound demands in the information plane. The mastering

technique operates in the data plane, where requests and responses for the carrier are prompt. This enables the smoothing of the getting to know the procedure to determine upon the feasible assets and extra unique provider transport besides duplication. The information management technique confirms much less replication and minimal provider response time regardless of the request and system density [29].

The fast progression of rising functions and the evolution of cloud computing applied sciences have substantially more desirable as well as the functionality of the technology generate tremendous quantities of data. Thus, it has emerged as a splendid assignment in this massive information technology to manipulate such a voluminous quantity of data. The latest developments in large information strategies and applied sciences have enabled many companies to deal with huge information efficaciously [30]. With the focus on huge information management, numerous massive data management methods check out and possible strategies of managing huge data by way of emphasizing on storage, pre-processing, processing, and safety is ensured by the AI-based big data technology.

Man-made brainpower, perform brilliantly upon the framework, which can be used in a game plan of any or the entirety of the structure squares to help B2B dealers to create, build up and utilize the data for a large group of advertising choices. The data sources measures yields and the utilization of assorted AI building block inside these can help B2B advertisers convert information into data and at last diverse kinds of data. Understanding the assorted sorts of data that AI empowers is critical for analysts and experts. For chiefs, these changes sway how a B2B firm can go to man-made consciousness to make, coordinate and offer information, for example theoretical resources and assets that may bring about a supported upper hand or prevalent hierarchical execution [31].

#### 4. COMPREHENSIVE ANALYSIS OF INFORMATION MANAGEMENT

The information management system has been studied and utilized by various business firms. The developed approaches and their significant inferences are elucidated in Table 2.

**Table 2. Comprehensive Analysis of Diverse Information Management Approaches**

| Author Name and Year of Publication                            | Inference                                                                                                                                                                                                                                                                                                                                                                                                                                         | Research Design   | Database           |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|
| Venkitachalam, & Willmott, (2016) [32]                         | Two kind of information management approaches utilize organizational knowledge. These techniques are personalization and codification strategy. These are employed in utilizing the most desirable use of organizational information. Strategic shifts among the approaches in an enterprise rely on the structure of the enterprise, information technology, size of the enterprise, and competitive atmosphere.                                 | Qualitative       | Emerald            |
| Razak, Pangil, Zin, Yunus, & (2016) [33]                       | Information management is handled and processed by data management workers in an enterprise that assists in directing the strategies, making a decision, making fit among the enterprise and its atmosphere, and also acquiring a competitive advantage.                                                                                                                                                                                          | Literature Review | Elsevier           |
| Corfield, & Paton, (2016) [34]                                 | The information management system is utilized to alter the culture of the organization to another preferred culture. This alteration is due to the rational decision-making process. Altering certain firms necessitated persistency, wide technique, and tools.                                                                                                                                                                                  | Qualitative       | Emerald            |
| Liebl, (2015) [35]                                             | The key area or aspect of a strategic information management system relies on the customers, resources, typical business atmosphere, and competencies. The correlation among this field is specifically significant in maintaining and formulating the strategy. The filling and identifying the gap in the information in the factors and areas of strategic information management are greatly decisive for efficient information management.   | Literature Review | Springer           |
| Singh & Rao, (2015) [36]                                       | The strategic management of human resources enriches information management.                                                                                                                                                                                                                                                                                                                                                                      | Literature Review | Springer           |
| Pietrzak, Jalousinski, Paliszkiwicz, & Brzozowski, (2015) [37] | A strategic group map is a distinct tool of information management, which is utilized in deciding concerning the competitive and progression of strategies. Information acquired by managing the information is employed as an input for the strategic group of the map.                                                                                                                                                                          | Qualitative       | Taylor and Francis |
| Ghannay & Mamlouk, (2015) [38]                                 | The context of the conceptual structure determines the sharing of organizational information and it plays a prominent role in the effective incorporation as well as the competitive intelligence. The necessary intelligence for a certain firm or organization is determined by the decision-makers. The intelligence is proficiently identified by the intelligent systems.                                                                    | Conceptual        | Google Scholar     |
| Alyoubi, (2015) [39]                                           | A decision provisioning system is an eminent tool that assists in deciding an effective plan across a diverse organization. The projected system is applied in a synergic way with the information management system that supports in deciding whereas, the strategy of the business is considered as a plan of firms growth to attain the competitive gain. Information management systems assist in formulating an effective plan for the firm. | Literature Review | Elsevier           |

|                                |                                                                                                                                                                                                                                                                                      |                   |                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|
| AL-Hakim & Hassan, (2014) [40] | In certain organizations or firms, middle managers play a prominent role in applying information management strategies. This incorporation enriches the performance of the organization or firm in the aspect of non-financial and financial in terms of innovation and performance. | Theoretical       | Google Scholar |
| Colakoglu, (2011) [41]         | The consistent and reliable progression of competitive intelligence is significant to propagate and stay in his great turbulent atmosphere. For this reliable progression, skills, knowledge, information, leadership, and capabilities of managers are greatly complicated.         | Literature Review | Science Direct |

## 5. CONCLUSION

The advancement in technology has made the growth of data and the data generated from diverse sources. The generated data is processed and maintained to acquire the needed information, which in turn significant decisions can be made. The nature and quality of information determines the necessities of technology to handle them, the acquired information is processed and the significant features are taken from the processed data. The retrieved significant information makes the business and other industry to make effective decision. The effective decisions are achieved by diverse approaches namely artificial intelligence (AI), deep learning and machine learning. The information's are processed effectively and the needed insights taken by the AI based technique whereas it also manages the information effectively. The diverse source of data generation has different structure of data format that is complicated to handle and manage. This, paper addressed the applications and trends of information management with AI and also gave a comprehensive analysis of information management system.

## REFERENCES

- Hinrichsen, S., Adrian, B., & Bornewasser, M. (2020, April). Information management strategies in manual assembly. In *International Conference on Human Interaction and Emerging Technologies* (pp. 520-525). Springer, Cham.
- Ye, X., Wang, Z., Zhang, Y., & Li, H. (2020). How do knowledge governance mechanisms impact on repatriate knowledge transfer intention? The moderating role of perceived career and repatriation support and person-organization fit. *Management Decision*.
- Collins, G. S., & Moons, K. G. (2019). Reporting of artificial intelligence prediction models. *The Lancet*, 393(10181), 1577-1579.
- Lu, H., Li, Y., Chen, M., Kim, H., & Serikawa, S. (2018). Brain intelligence: go beyond artificial intelligence. *Mobile Networks and Applications*, 23(2), 368-375.
- Polyzotis, N., Roy, S., Whang, S. E., & Zinkevich, M. (2017, May). Data management challenges in production machine learning. In *Proceedings of the 2017 ACM International Conference on Management of Data* (pp. 1723-1726).
- Sun, B., Ma, W., Li, B., & Li, X. (2018). Three-way decisions approach to multiple attribute group decision making with linguistic information-based decision-theoretic rough fuzzy set. *International Journal of Approximate Reasoning*, 93, 424-442.
- Balducci, B., & Marinova, D. (2018). Unstructured data in marketing. *Journal of the Academy of Marketing Science*, 46(4), 557-590.
- Patibandla, R. L., & Veeranjanyulu, N. (2018). Survey on clustering algorithms for unstructured data. In *Intelligent Engineering Informatics* (pp. 421-429). Springer, Singapore.
- Hadjimichael, D., & Tsoukas, H. (2019). Toward a better understanding of tacit knowledge in organizations: Taking stock and moving forward. *Academy of Management Annals*, 13(2), 672-703.
- Muthuveloo, R., Shanmugam, N., & Teoh, A. P. (2017). The impact of tacit knowledge management on organizational performance: Evidence from Malaysia. *Asia Pacific Management Review*, 22(4), 192-201.
- L. Neumeyer, B. Robbins, A. Nair, and A. Kesari, "S4: Distributed stream computing platform," in Proc. IEEE Int. Conf. Data Mining Workshops, 2010, pp. 170-177.
- M. Zaharia, T. Das, H. Li, T. Hunter, S. Shenker, and I. Stoica, "Discretized streams: Fault-tolerant streaming computation at scale," in Proc. 24th ACM Symp. Operating Syst. Principles, 2013, pp. 423-438.
- B. Fan, D. G. Andersen, and M. Kaminsky, "MemC3: Compact and concurrent MemCache with dumber caching and smarter hashing," in Proc. 10th USENIX Conf. Netw. Syst. Des. Implementation, 2013, pp. 371-384.
- B. Fitzpatrick and A. Vorobey. (2003). Memcached: A distributed memory object caching system [Online]. Available: <http://memcached.org/>
- D. R. K. Ports, A. T. Clements, I. Zhang, S. Madden, and B. Liskov, "Transactional consistency and automatic management in an application data cache," in Proc. 9th USENIX Conf. Netw. Syst. Des. Implementation, 2010, pp. 1-15.
- M. Zaharia, M. Chowdhury, T. Das, A. Dave, J. Ma, M. McCauley, M. J. Franklin, S. Shenker, and I. Stoica, "Resilient distributed datasets: A fault-tolerant abstraction for in-memory cluster computing," in Proc. 9th USENIX Conf. Netw. Syst. Des. Implementation, 2012, p. 2.
- A. Shinnar, D. Cunningham, V. Saraswat, and B. Herta, "M3R: Increased performance for in-memory hadoop jobs," Proc. VLDB Endowment, vol. 5, pp. 1736-1747, 2012.
- R. Power and J. Li, "Piccolo: Building fast, distributed programs with partitioned tables," in Proc. 9th USENIX Conf. Operating Syst. Des. Implementation, 2010, pp. 1-14.
- V. Sikka, F. Earber, A. Goel, and W. Lehner, "SAP HANA: The evolution from a modern main-memory data platform to an enterprise application platform," Proc. VLDB Endowment, vol. 6, pp. 1184-1185, 2013.
- A. Kemper and T. Neumann, "HyPer: A hybrid OLTP & OLAP main memory database system based on virtual memory snapshots," in IEEE 27th Int. Conf. Data Eng., 2011, pp. 195-206.
- R. Kallman, H. Kimura, J. Natkins, A. Pavlo, A. Rasin, S. Zdonik, E. P. C. Jones, S. Madden, M. Stonebraker, Y. Zhang, J. Hugg, and D. J. Abadi, "H-store: A high-performance, distributed main memory transaction processing system," Proc. VLDB Endowment, vol. 1, pp. 1496-1499, 2008.
- C. Diaconu, C. Freedman, E. Ismert, P.-A. Larson, P. Mittal, R. Stonecipher, N. Verma, and M. Zwillig, "Hekaton: SQL server's memory-optimized OLTP engine," in Proc. ACM SIGMOD Int. Conf. Manag. Data, 2013, pp. 1243-1254.
- B. Shao, H. Wang, and Y. Li, "Trinity: A distributed graph engine on a memory cloud," in Proc. ACM SIGMOD Int. Conf. Manag. Data, 2013, pp. 505-516.
- S. Ramachandran. (2013). Bitsy graph database [Online]. Available: <https://bitbucket.org/lambdazen/bitsy>
- MongoDB Inc. (2009). MongoDB [Online]. Available: <http://www.mongodb.org/>
- S. Sanfilippo and P. Noordhuis. (2009). Redis [Online]. Available: <http://redis.io>
- J. Ousterhout, P. Agrawal, D. Erickson, C. Kozyrakis, J. Leverich, D. Mazi\_eres, S. Mitra, A. Narayanan, G. Parulkar, M. Rosenblum, S. M. Rumble, E. Stratmann, and R. Stutsman, "The case for RAMClouds: Scalable high-performance storage entirely in dram," ACM SIGOPS Operating Syst. Rev., vol. 43, pp. 92-105, 2010.
- B. Fitzpatrick and A. Vorobey. (2003). Memcached: A distributed memory object caching system [Online]. Available: <http://memcached.org/>

- Diène, B., Rodrigues, J. J., Diallo, O., Ndoye, E. H. M., & Korotaev, V. V. (2020). Data management techniques for Internet of Things. *Mechanical Systems and Signal Processing*, 138, 106564.
- Aisha Siddiqa, Ibrahim AbakerTargioHashem, IbrarYaqoob, Mohsen Marjani, ShahabuddinShamshirband, Abdullah Gani, FarizaNasaruddin (2016). A Survey of Big Data Management: Taxonomy and State-of-the-Art. *Journal of Network and Computer Applications*
- Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing*.
- Schriber, S., & Venkitachalam, K. (2020). 8.1 Strategizing and Strategy Making in Uncertain Times-Northern Europe Perspective. *Nordic Academy of Management 2021*.
- Razak, N.A., Pangil, F., Zin, M.Z.M.L., Yunus, N.Z.M., & Asnawi, N.H. (2016). Theories of Knowledge Sharing Behavior in Business Strategy. *Procedia Economics and Finance*, 37(1), 545 – 553.
- Corfield, A., & Paton, R. (2016). Investigating knowledge management: can KM really change organisational culture?. *Journal of Knowledge Management*, 20(1), 88-103.
- Liebl, F. (2015). Knowledge management for strategic marketing. In *Assessing the Different Roles of Marketing Theory and Practice in the Jaws of Economic Uncertainty*, 48-57. Springer International Publishing.
- Singh, B., & Rao, M. K. (2015). Exploring the Linkages between Human Resource Configuration and Knowledge Management Process: A Strategic Human Resource Management Perspective. In *Managing in Recovering Markets*, 295-302. Springer India.
- Pietrzak, M., Jałosiński, K., Paliszkievicz, J., & Brzozowski, A. (2015). A case study of strategic group map application used as a tool for knowledge management. *Journal of Computer Information Systems*, 55(2), 68-77.
- Ghannay, J. C., & Mamlouk, Z. B. A. (2015). Influence of Organizational Culture on Competitive Intelligence Practice: A Conceptual Framework. *International Journal of Innovation, Management and Technology*, 6(1), 35.
- Alyoubi, B. A. (2015). Decision Support System and Knowledge-based Strategic Management. *Procedia Computer Science*, 65, 278-284.
- AL-Hakim, L. A. Y., & Hassan, S. (2014). Who are the Crew Members on Implementation of Knowledge Management Strategies to Enhance Innovation and Improve Organizational Performance? *Journal of Resources Development and Management*, 3, 54-63.
- Colakoglu, T. (2011). The Problematic Of Competitive Intelligence: How To Evaluate & Develop Competitive Intelligence?. *Procedia-Social and Behavioral Sciences*, 24, 1615-1623.

---

Received: June 25, 2023

Revised: June 30, 2023

Accepted: August 05, 2023

Copyright © 2023– All Rights Reserved

This is an open-access article.