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BIG DATA ANALYTICS AND KNOWLEDGE MANAGEMENT: BUILDING A STRATEGIC FRAMEWORK

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ABSTRACT

Big Data Analytics (BDA) has become one of the most significant assets for organizations, enabling organizations the capability of understanding the complicated patterns as well as making informed decisions based on rich information. At the same time, Knowledge Management (KM) is a notable activity that deals with the acquisition, storage and application of information which should improve organisational productivity and creativity. The present work aims to discuss the connection between BDA and KM and to outline a strategy that capitalizes on the advantages of both fields. When integrated, BDA's capacity to analyse huge swathes of data and KM's concentration on learning from information, organisations can gain a competitive advantage. The discussed framework pays particular attention to the integration of BDA projects with KM plans in order to facilitate the application of the generated big data insights into the organization. Some of the main considerations of the framework incorporate data governance, technology structures and organizational culture the four of which are essential in obtaining useful integration of BDA and KM. Other issues include data privacy, lack of skilled persons, and learning issues due to the ever-changing technology in a given field. This particular strategic framework will therefore facilitate the strengthening of an organisation's performance in innovation and its market responsiveness, as well as the general achievement of sound decisions in meeting organisational goals for sustainable organisational growth. The conceptual structure is a reference model for organizations that want to benefit from the utilization of large volumes of data in their operations and for knowledge management to happen and create value.

Keywords: Big Data Analytics, Knowledge Management, Strategic Framework, Data Governance, Organizational Innovation.

1. INTRODUCTION

In the current and modern world, data has become a very crucial commodity especially in the current world that is experiencing digital transformation. Data has been growing at an exponential rate due to improvement in technology, this has led to the development of Big Data Analytics which can be used by organization to analyze the large data that it gathers. However, more worth of such insights can only be understood if such insights are incorporated into the organizational knowledge base and used to improve on the decision-making systems. This is where Knowledge Management (KM) adds on its value, as a strategic tool in the management of an organisation's wealth. When brought together, both BDA and KM can help organizations derive full value for their business analytics by utilizing the generated knowledge to stimulate innovation, increase productivity and sustain competitive advantage. The subsequent sections of this paper present a strategic approach to the integration of BDA and KM while addressing the need to synchronize the two disciplines for sustainable result.

While a process of data analytics can be compared to climbing the Data, Information, Knowledge, and Intelligence (DIKI) pyramid, it is also divided into three fundamental steps. Each phase corresponds to a specific dimension—organization, people, and technology—and reflects distinct philosophical paradigms: That is, the research aims to adopt an epistemological perspective that include pragmatism, constructivism, and positivism. The first step is data cleansing, and it is the organizational dimension, which is based on the positivist paradigm because data cleaning is based on the quantitative analysis of information that has been obtained in the work of an organization. The second phase involves analysis of this information with the aim of forming knowledge, thereby supporting the 'people dimension' and the 'constructivist paradigm' as it is information comprehension that is personal and subjective. The last stage is the use of such knowledge to create strategic intelligence, associated

with the technology perspective and corresponding to the paradigm that is focused on real, executable effects. This approach defines how data analytics, applies the DIKI pyramid, utilises organisational processes, human wisdom, and technology in order to deliver insightful intelligence. It could be observed through the Figure 1.
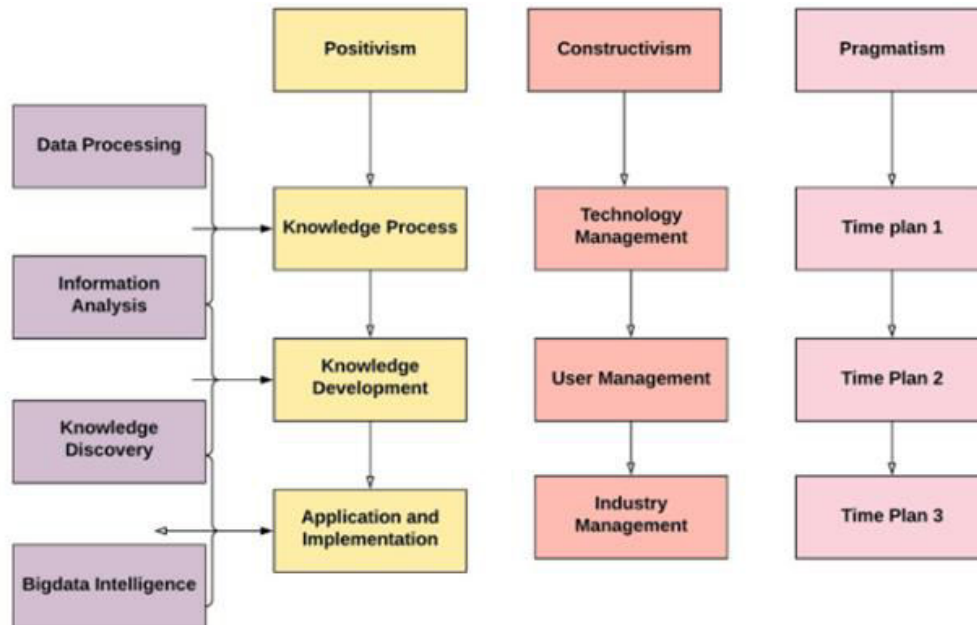

Figure 1: Process of data analytics alignment with the Data processing, Information analysis, Knowledge discovery and Bigdata Intelligence hierarchy.

1.1 The Role of Big Data Analytics in Modern Organizations

Big Data Analytics has become a revolutionary tool, by being able to help organizations to analyze data in real-time fashion. To sum it up, the strategic use of BDA gives companies insights that would otherwise remain unknown some of them includes; That is why the ability to predict trends in the market, in supply chains, as well as to determine the specificity of customer needs makes BDA one of the key tools in modern business. However, as indicated, the ability to support decision making through BDA is only as effective as the organisation's ability to assimilate the results of the analysis into its knowledge base. Some lost aspect of Big Data is explained for better comprehension in the following figure. Figure 2 shows some characteristics of big data.
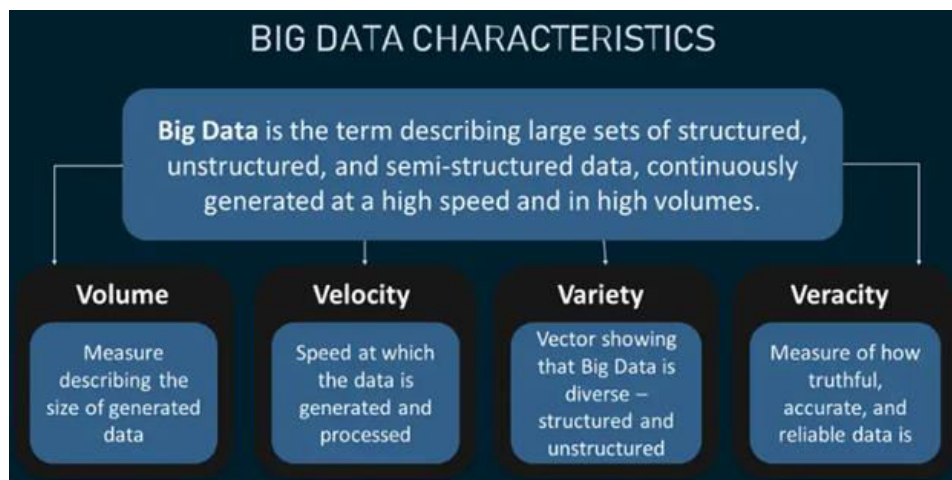

Figure 2: Big Data Characteristics

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1.2 Importance of Knowledge Management in Organizational Success

Knowledge Management is about codification, acquisition, organization and deployment of the knowledge that is present in an organization. They need to be captured, stored and made available to, for instance, employees of the organisation in need of such data as they work in other departments. Organizational KM best practices therefore enhance generation of value to an organization through knowledge sharing, problem solving , innovation, decision making, among others. We also see that when implemented together with BDA, KM assists organizations in more than just the creation of the insight; it is about bringing that insight into practice for the benefit of strategic goals.

1.3 Aligning Big Data Analytics with Knowledge Management

BDA and KM are two disciplines that have to be aligned towards a shared vision which means that the integration of the two has to be strategic. I would like to stress that organisations should make sure that their BDA projects are aligned with the process of knowledge transfer and feeding into an appropriate KM system. This alignment requires the development of structures for data management, the acquisition of the appropriate technology tools, and improving the organizational culture, particularly, having it accept the perpetuity of learning and knowledge sharing as valuable norms. By integrating BDA and KM, organisations can guarantee that data analysis is used to its optimum capabilities.

The integration of BDA with KM is not without its difficulties. Challenges including data privacy, scarcity of personnel, and the problem of handling large volumes of data may affect the incorporation and application of these interdisciplinary fields. Further, there are also more cultural issues with regard to knowledge sharing and collaboration across departments within an organisation. It is challenged by the issues that have to do with training, communication, and the establishment, enforcement, and maintenance of solid data governance policies.

In this paper, the author designs the following strategic framework that can be used to integrate Big Data Analytics and Knowledge Management. It defines the fundamentals that must be in place for integration to occur; data management, technology support, organisational readiness, and knowledge acquisition. Using the above framework, there is a possibility of integrating the two fields and come up with a coherent strategy that can enhance the application of both BDA and KM. In this regard, the following approach achieves more than improving the organizational ability in innovation and adaptation to the market change; it also guarantees the efficiency of the knowledge management process and its impact on the organization's growth.

2. REVIEW OF WORKS

BDA and KM integration research has attracted increased attention in the recent past because it enables organizations to harness data and information effectively with KM. This knowledge management literature suggests a variety of KM processes and change in the use of technology in these processes. The present review cumulatively provides essential information extracted from various studies and provides a detailed review of the KM practices integrating with BDA. The review is divided into five sub-sections, each of which is devoted to a single aspect that is or could become significant to KM in contemporary organizations.

2.1 Intranet-Based Knowledge Management

Scholars have paid much attention to how intranet systems can support organization knowledge management. Edenius and Borgerson (2003) also studied the use of intranet as tool for Knowledge Management; similar to Liebowitz (2000), these authors stressed on the idea that intranet may help in particular in the transfer of knowledge across the different levels in an organisation. They posit that, where well executed, intranets carry the potential of being used in pulling together organizational knowledge rendering it easily accessible through sharing. This approach is inline with the general concept of the KM whereby the aim is to ensure that the insights as well as the expertise that is received by the organization is properly implemented.

Nevertheless, it has been found that the implementation and use of intranet-based KM systems are severely driven on the extent that the users engage with the technology and the extent that the technology is aligned with the organizational goals. Edenius and Borgerson (2003) thus also pointed to the issues with practicing intranet systems, primarily noted for the constant updates and incorporation of the users' feedback so as to make the

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website relevant and easy to navigate. According to the authors, there is need for organizations to employ a systemic strategy in the management of intranets measures that will enhance the usability and bring about integration with the overall strategic KM approach.

2.2 Knowledge Transfer in Shift Work Environments

KL includes one of the most responsive elements, namely the transfer of knowledge, especially in organizations where employees are on shifts. Bosua and Venkitachalam (2015) studied the different ways through which knowledge transfer occurs in shift work organisations where there are disruptions in work schedules. They discovered that the practice of knowledge management in those circumstances cannot be taken for granted and needs purposeful efforts together with the use of information technologies to support the codification process and make the transferred knowledge accessible to other shifts. The study stresses on the need for developing structures in order to enable organisational learning to go on throughout the temporal disruption of shift work.

The authors also stressed that organisational culture is another determinant of knowledge management and transmission. The authors Bosua and Venkitachalam pointed out that it is crucial to state that an organisational culture that supports knowledge sharing and collaboration is required in order to counter the difficulties of shift work properly. This means introducing the right technologies at workplace as well as creating a culture that permits workers to come out with useful information and knowledge. Therefore, this paper concludes that there is a need for organisations, intending to implement KM in shift work environments, to factor in the effects of technology, as well as; cultural practices at the workplace.

2.3 Knowledge Management as a Management Fashion

Ther has been debate on the concept of KM with some scholars raising an eyebrow on whether it is just another management fad. Hislop (2010) was able to tackle this problem by analysing the duration and development of KM procedures. The author while acknowledging that KM perhaps was initially cast in the mold of a management fashion contended that its steady showing up in organizational strategy was proof of latter. Hislop's observation suggests that KM is now an inherent aspect of the management of the intellectual capital in organisations based on the relevance of knowledge in fostering competitive advantage.

Hislop (2010) also spoke on the possibility of costs that organizations managing KM have exposed themselves to because of managing KM as a trend. He points out that's it can occur that organisations can implement KM practices at the tactical level only meaning that they add those practices to their strategic management system only on the paperwork level. This can in turn create a lack of sustainability and effectiveness of the KM endeavors. Hence, there is a need to develop the sustained commitment with the KM as a strategic function and not the short-lived management fashion.

2.4 Crisis Management and Knowledge Management

Crisis management has also been integrated with the concept of KM where knowledge is applied when managing crises by several scholars. Ponis and Koronis (2012) put forward a process-based view of KM which can underpin corporate crisis management. They contended that the KM processes, in as much as it was designed, can actually give organizations the flexibility and stability needed to address emergencies. Their framework stresses the value of immediate access to information and decision-making at the times of crises, which affects the organisational capacity in managing risks and absorbing shocks.

The authors have also pointed out the leadership factor in integrating knowledge management with crisis management. From the same source Ponis and Koronis (2012), it was observed that crisis management is agility and needs someone to be able to quickly generate and distribute reliable knowledge assets at the right place in the right time. Thus, this study findings also pointed out the leadership's need for encouraging a KM culture that can foster humane and strategic crisis management processes.

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2.5 Technological Advancements in Knowledge Management

KM practices have been affected by the fast-growing technology, especially with the inclusion of artificial intelligence and big data. In their paper Banica et al. (2020) highlighted the use of AI in KM and presented the argument that AI can enhance IT by supporting the utilisation of knowledge capture and sharing. There is still potential for automation of KM systems and by doing so, the systems make it possible for organisations to handle more extensive jobs and acquire more efficient methods of filtering through data to pull out significant insights. To this end, the study demonstrates the possibilities of using AI to improve and even transform KM and make it much more adaptive to the organization's requirements.

Likewise, Kejriwal (2020) evaluated the position of business intelligence tools in KM and found the tools to have become critical for organizations that want to harness big data. He further contended that business intelligence integrated when applied to KM means that organizations can process data in real-time, come up with insights that are useful for decision-making at the strategic level. From the results of the study it is implied the organization should embrace changed KM practices that will incorporate new technologies to boost the organizations KM capacity.

The literature on KM has pulled together a numerous perspective and approach for exploring the management of knowledge in organizations. Kindergan (2018) in his study of the effectiveness of intranet systems that support knowledge sharing within organizations underscored the knowledge management organization alignment with organizational strategy. Indeed, as new technologies are developed and implemented in organizations, KM as a tool for creating competitive advantage will remain an even more important factor and will demand further changes in the strategy of organizations.

3. PROPOSED METHODOLOGY

This research will employ a secondary analysis research design to explore the implementation of Big Data Analytics (BDA) and Knowledge Management (KM) within organisations. The approach used in the study reflects an intention to conduct a methodical and sequential analysis of the identified studies aimed at comparing and analyzing approaches and findings concerning the strategic correspondence of BDA and KM activities, as well as their integration and difficulties; the studies will also be used to assess the effectiveness of the existing frameworks. Using data from prior studies, the research will aim at developing a strong framework of understanding of BDA and KM integration based on which a new strategic approach will be designed.

3.1 Data Source Selection

The first thing done in the context of the methodology is where the authors identify appropriate studies to be reviewed, that indeed deals with BDA and KM. The sources of data collection would include studies that are freely available in online academic databases including Google Scholar, Scopus and Web of Science. The source criteria will also restrict the articles, conference papers and the industry reports to be used to the ones that have been published within two decades to capture the current trends and practices. In order to include papers into the analysis, the following criteria will be followed: 1) Subject relevance; Papers focusing on major issues related to general theories of BDA and KM, their alignment, integration issues, and effects of these practices on organizational performance.

3.2 Data Extraction and Coding

After the examination of the eligible studies, data extraction will be performed methodically with the help of a coding matrix. This framework will include for instance- objectives of the study, methods of study, findings and results of the study, and recommendation implications. Data source coding will entail the generation of pattern codes, theme codes and relationship codes that will relate to the various studies. This approach is expected to facilitate an integration of the qualitative and quantitative data collected from multiple sources in order to understand how BDA and KM have been deployed in diverse organisations.

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3.3 Thematic Analysis

It is in these achieved themes that thematic analysis will be applied in organization and evaluation of the extracted data and studies. With the help of thematic analysis, it will be possible to identify the major issues that organizations encounter when implementing BDA and KM and the measures that can be taken to address these issues. As part of this, the work will also uncover blind spots in the current research and offer a rationale for developing new strategies toward the convergence of BDA and KM.

3.4 Framework Development

With reference to the themes identified in the present study, a strategic plan for the integration of BDA and KM will be created. This framework will let them define aspects including data management, technological platform, organizational culture, and or continuous learning. The framework will be developed with a view of filling in the gaps that were evident in the literature on how to facilitate the integration of BDA and KM in organisations. The proposed framework will be checked to match with the findings of previous research studies to ascertain its usefulness in different organisational scenarios.

Accordingly, this paper will use secondary data analysis to develop a detailed body of knowledge on BDA and KM integration. Thus, by reviewing the results of prior studies, the research attempts to propose a set of recommendations that can facilitate strategic framing of knowledge management improvement efforts by organisations taking advantage of big data opportunities.

4. RESULTS AND DISCUSSION

Conclusions drawn from this study based on the synthesis of the published literature pertain to the BDA-KM integration. The findings are categorized into five key areas: strategic planning, issues associated with fit, extent and performance outcomes of integration, technology support and organisational culture.

4.1 Strategic Alignment of BDA and KM

The study suggested that BDA and KM integration requires the utilization of the two fields in accordance to their organizational fit. In various researches, it has been evidenced that the firms that are using BDA in line with KM goals are more suited to harness big data appropriately. This alignment enhance capturing, storing and sharing of the knowledge obtained from big data, so as to enhance decision making processes within the organization. In addition, through the use of BDA, advanced KM strategies are employed to update the knowledge bases used by an organisation to ensure their fluency and applicability in the present.

4.2 Challenges in Integration

Nonetheless some issues regarding the integration of BDA and KM were outlined as follows in the reviewed studies; Some of the major issues faced in big data management include privacy of big data, big data volume that is difficult to manage, and shortage of professional who have the competency on how to address difference between data analytics and knowledge management. The issues arising out of integration involve the technical and social integration problems like the ability to put analytic results across to non-technical staff of an organization. The challenges above provide a clear argument as to why there is necessity in coming up with full-immortal integration approaches that would include both technological integration aspect and human integration aspect.

4.3 Impact on Organizational Performance

As seen from the reviewed studies, the integration of BDA and KM enhances the performance of organisations in many ways. From the case studies of organisations that have implemented these disciplines, there are increased innovation, effectiveness and competitiveness. Combining Big Data analytics with the firm's knowledge enables organisations to act faster to shifts in demand, improve efficiency, and meet customer needs. But the measure of this impact depends on the efficiency of the integration process and the organisational capacity to manage the challenges arising from it.

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4.4 Technological Infrastructure

This aspect actually remains prominent and unambiguous in the literature in relation to the support of the integration of BDA and KM through technological infrastructure. Research also indicates that the organizations with better technology infrastructure in terms of platform for BDA integration and Knowledge Management information with AI analytics and data governance capabilities, are more effective in BDA integration. It is important to have tools that enables the free flow of information and knowledge within the organization to enable the capturing, storage and use of that information. Further, AI technologies have been found to be an enabler for this process because it means that knowledge can be captured and processed automatically.

4.5 Organizational Culture and Knowledge Sharing

Culture plays central role in integrating BDA and KM in organizations. The literature underlines that the key success factor in integration is the use of a knowledge-sharing culture. Openness in the organization, learning orientation and cross-funcation integration is helpful in maximising the strengths of BDA and KM. Restriction from cultural factors like departmentalization as well as resistance to change were also discovered to hamper integration to a large extent. Hence, successes, ideas are missing the culture that accepts people's information and analytical data by embracing them for the given results.

In conclusion, therefore, it is clear that this study has provided insights into the challenges associated with the integration of BDA and KM; in equal measure, it has served to demonstrate how this integrational approach can yield very rewarding results. The research results are used in the construction of a strategic tool that would resolve the issues highlighted, as well as optimise the features of BDA and KM to boost organisational performance.

5. CONCLUSION

Big Data Analytics and Knowledge Management integration is a challenging but a strategic process in managing big data in organizations today. As has been exemplified by this study, the move to integrate BDA with KM strategies has many advantages such as; better decision-making ability, optimised business processes, increased competitiveness, among others. The study affirms the argument showing from a previous systematic literature review that to attain organisational value, different types of knowledge such as information provided from data analyses must be well integrated. Organizational integration should be done in a systematic and planned manner, so as to address both technological enabler and cultural issues, to ensure that not only insights are produced, but these insights are also put to good use within the organisation.

But this integration process, the research also unveils several difficulties that are connected with it. Some of the challenges facing BART and other big data projects are; Data privacy issues; They involve huge volumes of data hence its management poses a challenge; Inability to recruit competent personnel who are able to fill the gap between big data analytics and knowledge management. These challenges have to be met and resolved in order to achieve a proper integration, as it is, in fact, the combination of adopting new technologies and the organisational culture in that specific setting. To overcome these barriers Organizations must strengthen the data governance framework and Organizational learning prominently for the successful integration of BDA and KM.

The concept of the strategic framework for BDA and KM integration as described in this work can be seen as a versatile solution that would help overcome the discussed challenges and, at the same time, bring the benefits of both fields. Integration of BDA with KM, adoption of right tool and technique for processing and storing big data, creating right environment for knowledge sharing. Through the use of this framework, organizations can create more innovation, flexibility, change, and, therefore, sustainable growth and organizational success in the given data-driven society.

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