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## IMPLEMENTATION STRATEGIES AND ITS CHALLENGES IN ARTIFICIAL INTELLIGENCE TECHNOLOGIES

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### Abstract:

*Across the world, countries have certain AI regulation and policies in place for its implementations. Most of the benefits provided by the AI technologies are broader in scope. One of the main focus of this article is to highlight current strategies and their usage, with one objective to seek efficiency and their effectiveness in different situations. Mostly addressing the issues and their results. Although, literature within AI development have some major obstacles. The scope of this study is focused on the data security, data storage and infrastructure and their major challenges to improve efficiency and effectiveness of the AI technologies and strategies adopted to overcome ethical issues, governance, explainability, accessibility and quality of the data. Artificial intelligence (AI) technologies have gained widespread popularity in recent years due to their ability to revolutionize various industries, including healthcare, finance, manufacturing, and transportation, among others. However, implementing AI systems is not a straightforward process and involves several challenges that need to be addressed to ensure successful deployment. In this article, we will discuss some of the implementation strategies and challenges associated with AI technologies.*

**Keywords:** AI (Artificial Intelligence), Strategies, Challenges etc.

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### Introduction:

Most nations have national Artificial Intelligence policies in place to take advantage of AI's advantages, and the majority of these initiatives are broad and granular in scope. The aim of the is an assessment of current methods and their future use, with the goal of finding efficient and successful solutions as well as the issues that come with them. Although the literature mentions many major difficulties, the scope of this study is

confined to data kinds, data security, storage, and infrastructure.

### Efficiency as a Strategy:

This strategy is based at the operational level and depended on the data that is available. Most of the countries have this strategy implemented by using already available data to them. An important beneficial effect of artificial intelligence is the way employees execute their job and focus on the basic or core

functionality of the operation by reducing repetitive tasks assigned to them.(Partner,2019). This functionality of artificial intelligence can be seen with uruguangan government, where interoperability platform is implemented to enable to improve integration between the government and non-government agencies.

*In engineering and construction sector,* Implementation of Artificial Intelligence/Machine Language (AI/ML) has shown increase in efficiency at all levels of the engineering process and in project design, asset risk management and logistic supply chain.

AI/ML technology intervention: Augmenting with emerging technologies with Artificial intelligence is the key, such as using AI/ML technologies to potential increase safety and efficiency in their respective projects. Usage of AI/ML incubated within the IT/Computer visual system, in the form robots are utilized to increase efficiency and quality control and fault detection and identification( Jose Blanco. 2018).

*In transport and planning,* Using AI/ML language there has been a dramatical changes in transport and traffic management planning in a short-term and long-term. For optimaefficiency in transport and traffic management planning, AI/ML has enhanced a dynamic planning options to improve traffic flow and traffic management which are usually time consuming with help AI/ML it can reduce man hours.( peter sot-2016).

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AI/ML technology intervention: combining and implementing AI/ML technologies with other prevailing technologies could pave way for automation and eliminating repetitive tasks that save time and money in the long run.

#### **Examples of Efficiency as a Strategy:**

Few best known examples of AI/ML is google, Amazon and Facebook sites, which provides recommendation based on the previous search key words, Window's Cortana and Siri are functionality based on ML applications to learn and understand real-life conversations (Jack, 2018) which are basically a enhancing efficiency.

In insurance set up, Lemonade and policy genius use ML/AL technologies to provide support to their policy offering, by simplifying and tailor made policy offerings to corelated to the needs of the policy holder. AI/ML has provided speed up claims payment significantly (Hehner,et.al.,2017).

From the above information, it can be said that AI/ML at operational or tactical level is seen as an efficiency strategy, From the figure 12, it is shown that most of the companies or organizations are using this strategy.

#### **Effective Strategies:**

To achieve strategic objective of the organization, association internal data and AI/ML technologies will enable to make decision at a functional level. This combination with key performance

indicators enhance leader and managers to make informed decision at a strategic level.(schmetzer r 2020). According (Schmtzer R, 2020) AI/ML and strategic priorities provide different level of contribution at different levels and also emphasized the need to focus on business case by case. To effectively deploy AI/ML at strategic level quality of data plays a vital role, this can be seen in figure 12, which indicates benefits to non-leaders and leaders, which is clear to conclude that effective strategies are present at strategic level.

In the healthcare industry, AI/ML has a significant impact on efficiency and efficacy. From record management to surgical technique, AI/ML has a wide range of applications in practice. Although data sets have their own set of challenges, the effectiveness of AI technology is successfully utilized in this industry. (Bernard, 27, 2018).

AI/ML technology intervention: This sector has witnessed a high degree of effectiveness of artificial intelligence technology implementation, in terms of robotic tasks. This in turn applies to perfection, moveability and reduced risks associated with surgical procedures. Applied artificial intelligence technology has decreased the turnover time for surgery (Benard 2018).

#### **Effectiveness as Strategy Examples:**

As presented by OECD previously, robo-advice is developed for investment management, specifically to give quotes

and with automated advice, to help some segments of population, those who do not access to financial advice, which is cost effective. (OECD-2017).

Application of AI/ML is huge and important in conservation and biosecurity by promptly identifying vertebrates and insects which could pose a biosecurity threat in Australia and New Zealand. This technology has been used in Australia to sample water for temperature change related to coral reef degradation. (royalsociety.org.nz- July 2019).

Jaipuna has been used in New Zealand for tutoring high school and presenting one to one based interactive sessions. (royalsociety.org.nz- July 2019).

In the areas of emergency response, Australia has deployed drones programmed with AI system and software at the beaches that can monitor and distinguish sharks and other marine life from boats( royalsociety.co.nz, July 2019).

Artificial intelligence (AI) is being used by the legal profession to aid in the discovery of innovative and efficient ways to explore source documents and precedents.( royalsociety.co.nz, July 2019).

#### **Overview of Strategies:**

Almost all the companies or organizations (government and non-government agencies) are using any one of the strategies. Implementing these strategies at any level of organizations pose some challenges such as ethical, trustworthy, data security and

exploitability. Some of the challenges and their usage at different levels of functions.

### **Challenges To Implement Artificial Intelligence Strategies:**

#### **Big Data:**

A big data is information which is collected for better understanding the dynamics of economy and society as a whole and that is increasingly and progressively evolving. Big data can be defined as 3Vs (laney, 2018), volume, velocity and variety(chen, chiang and Storey,2012). According to(Gandomi and Haider,2015) big data are all “high”, high volume is the size of the data set which could require huge storage capacity in petabytes. High variety data is where there is structural homogeneity and heterogeneity of data set, these data set are usually in structured format, which contributes only 10-15% of all structured existing data for example of text, images, audio and videos. High velocity data is characterized as the speed and rate in which the data is created and generated, later analyzed and the outcomes are executed. For example, smart phones and sensor which produced unprecedented data at incredible speed.

According to (FCA, 2016), big data is referred as follows:

- Using data collected from unconventional sources such as social media, this media provides fresh and growing datasets.

- Emerging technologies need to make a provision to generate, collect, accumulate and store new unstructured data sets.
- Application of these data set in a practical way, such as in business activities and decision making.
- Enables to use advanced analysis techniques.
- Copy right, patent and proprietary data, collected from commercial organization such as personal data, this contributing to big data.
- Data collected or taken from the third party such credit cards details, discount data base and website traffic.

A point to note from the above, proprietary data, acquired data and connected device data are more like to be structured data set, which could be collected from internet of things. Big data and AI/ML go hand in hand collaboration, in which big data is the information and AI/ML is the process.

There are many generic categories of big data type and consists of multiple layers or types homogeneous and heterogeneous data derived from three main domains(wibison-2019), figure clearly presents different categories of data (figure 12). AI depends on the availability of quality of data and procuring quality data is often expensive and time consuming(berry-2019). Internal data and external exploited data, when merged together can produce different level of

challenge to execute AI strategies. Multi-dimensionality and overlapping data kinds provide security and storage difficulties that slow the flow of information into an understandable pattern (mulkau-2019).

Data biases pose another challenge, when data represents ethical inequalities, then deploying AI technologies could distort policy making which effects data to distort(pencheva-2018). Data that is collected and accumulated is not neutral and are associated with situational and contextual bias and the data collected is deliberately in a structured format and stored, this data could be discriminatory and this is an challenge. (Berry-2019), which may affect the implementation of AI strategies. This might have a detrimental effect on the strategy if the data is acquired using different methods and sources (sveid-2020).

Additionally, ratifying the integration of new data sets may be time consuming and resource intensive(seven-2020), which may cause delays in the implementation of AI methods that are efficient and effective. This complicates matters even further when the new data sets are non-standard.

Data Storage and SecurityData security and protection is special challenge for AI technologies. As Per GAO, protecting data privacy and personal data is one of the cyber security challenges that most of the organizations are facing. And according to GAO, information correlation between individual across large and numerous

multiple databases pose a challenge protect privacy data. Micro data sets are so complicated to correct for false attributes and missing point(cagala-2017), cleaning the micro data sets creates another challenge, especially in handling and accumulating big data. (GOA). One of the most serious and common problem is the veracity of the data and information gathered may be insufficient and insignificant (Meng-2014). Data quality of big data sets may present a non-standard format for official usage, this rises and important ethical issues(luveng-2020) that affect the outcomes of the strategies. Data sharing presents an issue with fragmentation of data, which requires an expert to re-organize it to usable standard, which is a time and resource consuming(luveng-2020).

### **Examples for Data as Challenge:**

#### **Infrastructure:**

The adoption of any new technology into the economy necessitates the development of a strong, concrete, and adaptable infrastructure; yet, there is currently no robust and flexible infrastructure that is driven by data and algorithms. Integrating new AI technologies into the old or obsolete Information technology infrastructure is huge obstacle for the new technology in term of funding. An obsolete technology cannot accommodate the fast-evolving technologies such as AI/ML technologies. Most of the government are finding it hard

to balance between the old technology and the new technology, which is a major challenge for implementing AI technology. (Desouze-2018).

Overcoming obsolete technology with new technology, a massive infrastructure funding is needed at the grass root level, which are sustainable. Across the globe, governments are taking action to solve this issue. It is very difficult to put polluted data under government infrastructure planning because of the commercial useability, regulatory difficulties, and cultural biases associated with this data (Ibid). On the other hand, dealing with heterogeneous data with low quality distorted data present an additional challenge to the infrastructure, this depends on the standardization and harmonization of data quality.

Other research have found that there are many challenges faced by the management like big data storage, transportation, management and processing problems Kaisler, S., Armour, F., Espinosa, J.A., Money, W.: Big data: Issues and challenges moving forward. In: System Sciences (HICSS), 2013 46th Hawaii International Conference on. pp. 995-1004. IEEE (2013). Other challenges for the management is been identified by various researcher, such as variety, sharing data, skill sets, technical experts and hardware issues Katal, A., Wazid, M., Goudar, R.: Big data: Issues, challenges, tools and good practices. In: Contemporary Computing (IC3), 2013

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Sixth International Conference on. pp. 404-409. IEEE (2013).

As pointed out by (Wu, X., Zhu, X., Wu, G.Q., Ding, W.: Data mining with big data. IEEE Transactions on Knowledge and Data Engineering, 26(1), 97-107 (2014), that big data is constituted by multiple heterogeneous data from heterogeneous sources with unstructured or unformatted represented can be unmanaged. Managing this kind of data needs high end performing managements tools failure to manage this kind of data could lead to unacceptable outcomes. According to (Fan, J., Han, F., and Liu, H.: Challenges of large data analysis). In order to keep up with the ever-increasing variety of data formats, organizations must adopt more current data storage methods that are flexible and scalable to accommodate the ever-increasing volume of data. "Big data": issues and concerns going ahead, according to Kaisler, S., F. Armour; JA Espinosa; and W. Money. As a part of the 46th Hawaii International Conference on System Sciences (HICSS), pp. 995-1004. The International Electro Technical Commission (2013). When it comes to storing and processing massive amounts of data, current systems aren't equipped to handle such an undertaking. This extends to equipment and processes that aren't up to date to process the information in real time as well, as noted by [the study authors]. "Big data" is a broad term that encompasses a wide range of topics, including issues, difficulties and best



practices. Sixth International Conference on Contemporary Computing (IC3).The International Electro Technical Commission (2013). Entities are disallowed as a result of this massive data drawback, even if few indexing systems are recommended by their writers. Fastbit: an efficient indexing system for data-intensive research, Wu, K. In: Journal of Physics: Conference Series. vol. 16, p. 556. IOP Publishing (2005), (Dittrich, J., Quiane-Ruiz, J.A.: Efficient big data processing in hadoopMapReduce. Proceedings of the VLDB Endowment 5(12), 2014-2015 (2012),and ( Triguero, I., Peralta, D., Bacardit, J., Garcia, S., Herrera, F.: MRPR: A MapReduce solution for prototype reduction in big data classification. neurocomputing 150, 331-345 (2015), still treat them as a challenge for the management.

In spite of big data processing programs, still there is need for highly skilled professional to handle the complex nature of the heterogeneous data that are suitable to business (Chen, C.P., Zhang, C.Y.: Data-intensive applications, challenges, techniques and technologies: A survey on big data. Information Conference on. pp. 404-409. IEEE (2013) and still it is challenge for the management. According to report by McKinesey& Company [10]( Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., Byers, A.H.: Big data: The next frontier for innovation, competition, and productivity (2011), that

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there is a need for advanced analytical skill and companies who require these big data analyst are in short supply in the market place.

Heterogeneous data from different sources into single data catalog is called data loading. Data from multiple sources need to unified into structured format and infrastructural framework by including the size and speed of the data, which are displayed in a timely behavior. As with loading of data from various platform synchronization of data from different data sources and at variable time gaps are treated as critical challenge for the management. This means to say that data from different sources and data catalogue should correlate to each other in terms of time and sequence. When the data processing program is not able guarantee to provide stable and consistent valid outcomes, then it can be treated non-synchronization of data sources, which are heterogeneous in nature (Driscoll, A., Daugelaite, J., Sleator, R.D.: big data, hadoop and cloud computing in genomics. Journal of biomedical informatics 46(5), 774-781 (2013) that could make it more complex challenge for the management.

### **Conclusion:**

This review briefly focused on big data sets, data types, data security/storage infrastructure as a challenge to implement. Based on the usage, applicability, and outcomes of AI, two strategies are

identified based on efficiency and effectiveness of the AI technology. By reviewing earlier literature, other challenges are identified such as ethical issues, governance, explainable, accessibility, availability, and quality of data to implement AI to avail the benefits of AI.

#### Recommendation:

- There is need for regulations at respective level of the development AI technologies
- Data ownership or AI system ownership and their relationship to openness.
- Environmental risks arising from obsolete technology and emerging technology, especially AI systems.
- Sustainable infrastructure for collaboration-multiple organizations long-term sustainable objectives.
- More broadly, research sharing should include considerations of intellectual property, copy rights, patents, and data protection regulations as well as ongoing monitoring.

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