Data and Metadata. 2025; 4:637
doi: 10.56294/dm2025637

ORIGINAL

Implementing AI Accuracy, Learning Rate, Inference Time on enhancing Big Data Analysis and Strategic Plan

Implementación de la Precisión de la IA, la Tasa de Aprendizaje y el Tiempo de Inferencia para Mejorar el Análisis de Big Data y el Plan Estratégico en Zain Jordan

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Cite as: Hanandeh A, ALFreijat SY, Qutieshat RJ, Alsha'ar H yuosef, Kilani QA, Saleem Khasawneh MA. Implementing AI Accuracy, Learning Rate, Inference Time on enhancing Big Data Analysis and Strategic Plan. Data and Metadata.2025; 4:637. https://doi.org/10.56294/dm2025637

Submitted: 05-02-2024 **Revised:** 10-07-2024 **Accepted:** 10-02-2025 **Published:** 11-02-2025

Editor: Dr. Adrián Alejandro Vitón-Castillo

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ABSTRACT

Introduction: This study aims to focus on the role of artificial intelligence tools and capabilities such as artificial intelligence accuracy, learning rate and inference time in influencing big data analysis and building strategic plans at Zain Jordan Telecommunications Company.
Objective: The review explores how increasing the ability of organizations to maintain competitive capabilities in an era of continuous change and development in the field of information technology, most organizations focus on adopting new tactics and increasing features to improve organizational performance, improve services provided to customers, simplify administrative and operational processes, improve operational efficiency and make strategic decisions.
Method: A research questionnaire was distributed to study the impact and measure the impact of artificial intelligence tools such as artificial intelligence accuracy, learning rate and inference time on increasing big data analysis capabilities and building strategic plans. 163 valid questionnaires were received for analysis and the data were analyzed using the PLSSIM system.
Result: Artificial intelligence tools such as artificial intelligence accuracy, learning rates and inference time positively affect increasing big data analysis and building strategic plans.
Conclusion: this study allows for a deeper understanding of the impact of artificial intelligence tools and capabilities in influencing big data analysis and building strategic plans.

Keywords: Learning rate; Inference time; Big Data Analysis; Strategic Plan; Zain Jordan.

RESUMEN

Introducción: Este estudio tiene como objetivo centrarse en el papel de las herramientas y capacidades de inteligencia artificial, como la precisión de la inteligencia artificial, la tasa de aprendizaje y el tiempo de inferencia, en influir en el análisis de big data y la construcción de planes estratégicos en Zain Jordan Telecommunications Company.

Objetivo: La revisión explora cómo aumentar la capacidad de las organizaciones para mantener capacidades competitivas en una era de cambio continuo y desarrollo en el campo de la tecnología de la información. La mayoría de las organizaciones se enfocan en adoptar nuevas tácticas y aumentar características para mejorar el desempeño organizacional, optimizar los servicios brindados a los clientes, simplificar los procesos administrativos y operativos, mejorar la eficiencia operativa y tomar decisiones estratégicas.
Método: Se distribuyó un cuestionario de investigación para estudiar y medir el impacto de las herramientas de inteligencia artificial, como la precisión de la inteligencia artificial, la tasa de aprendizaje y el tiempo de inferencia, en el aumento de las capacidades de análisis de big data y la construcción de planes estratégicos. Se recibieron 163 cuestionarios válidos para su análisis, y los datos fueron analizados utilizando el sistema PLSSIM.
Resultados: Las herramientas de inteligencia artificial, como la precisión de la inteligencia artificial, las tasas de aprendizaje y el tiempo de inferencia, afectan positivamente el aumento del análisis de big data y la construcción de planes estratégicos.
Conclusiones: Este estudio permite una comprensión más profunda del impacto de las herramientas y capacidades de inteligencia artificial en influir en el análisis de big data y la construcción de planes estratégicos.

Palabras clave: Tasa de aprendizaje; Tiempo de inferencia; Análisis de Big Data; Plan estratégico; Zain Jordan. (GRH); Herramientas de GRH; Oportunidades; Sostenibilidad.

INTRODUCTION

The telecommunications sector is considered one of the most vital and investment sectors in Jordan due to the tremendous technological development and high competition in it, which affected the Jordanian economy in general. However, recent studies show that there is a lack of progress in this sector that affects its growth and performance, and that there is a need for more studies that contribute to improving operational efficiency, increasing customer satisfaction and creative capabilities.[1] Focusing on the use of artificial intelligence tools that have the feature of accuracy gives organizations the ability to deal with the huge data coming from customers with high professionalism and strategic analysis that shows the characteristics and points that need to be improved related to operational and administrative processes and product specifications, in addition to improving the capabilities and skills of employees in dealing with modern technology and adapting to new technology and reducing the performance gap that affects the success of the organization as a whole.[2] The learning rate is also considered an element of artificial intelligence, which is used to measure the time an employee needs to train to use a new technological application or smart model. It is considered a measure of the capabilities and performance of employees. If the learning rate is high, it leads to the employee reaching the optimal solution faster. However, if the learning rate is low, the time the employee needs to learn the new technology takes longer and requires more training to reach accurate results.[3] In addition, this study focuses on choosing the inference time as a third element of artificial intelligence, which indicates the time needed to apply the new technology or use the smart model to support decision makers in making effective decisions and building a strategic plan based on the entered data. It is considered one of the decisive factors that measure the strength and ability of the technology used, such as comparing sound or image and measuring the ability of the application or system to respond to display the result quickly and more efficiently.[4]

This study aims to study the impact of the characteristics and elements of artificial intelligence as new variables that require several studies to measure their impact and importance, increase the knowledge provided about them, and expand cognitive capabilities in them to help business owners and decision makers in the communications sector to reach making this sector more sustainable and competitive in providing distinguished services to customers. Finally, this study aims to measure the impact of applying and using the characteristics and elements of artificial intelligence in raising the performance and capabilities of analyzing big data and building strategic plans as elements and means that help the decision maker in drawing a comprehensive work map for all parts, areas, and departments of the company in reaching the desired long-term strategic events.

Objectives of the Study

- The aim of this study is to enhance the understanding of artificial intelligence tools, specifically accuracy, learning rate, and inference time, and to explore their potential in optimizing big data analysis processes and supporting the development of strategic plans at Zain Jordan Telecommunication Company.
- The main objective of this AI-focused research is to provide a comprehensive framework for integrating accuracy, learning rate, and inference time into big data analytics within Zain. This approach aims to improve decision-making capabilities by enabling precise data processing, efficient employee training, and faster system response times. The study seeks to identify the impact of these AI elements

on operational efficiency, strategic planning, and overall organizational performance.

Literature review

AI Accuracy

The accuracy of artificial intelligence is a measure of the effectiveness of an artificial intelligence model in performing a specific task.[5] It is expressed by taking the ratio of correct predictions to the total number of predictions.[6] It is considered one of the most important means used to refine the reliability of the model used, which is a key measure in measuring the performance of applications used in the fields of health care, fraud detection, and autonomous driving.[7] The accuracy of the artificial intelligence model depends on various factors such as data diversity, data quality, training, and the type of algorithms used.[8] It generally indicates that there are two types of results that appear from using the element of artificial intelligence accuracy. The first result is the high accuracy of the model in dealing with invisible data when using one of the advanced technology or artificial intelligence applications and tools with high effort, and the second result is the low accuracy of the application or technology used, which shows the insufficiency of data or the use of a technological method or model with low performance.[9] The importance of using the accuracy of artificial intelligence tools and applications appears in measuring the percentage of deviation of current results from expected results. In some cases, the results of using artificial intelligence accuracy can give final results of up to 90 %, but the ten percent is considered a real risk and requires actual study, especially if the technology used or the application used is in areas of utmost importance such as medical fields, which require re-studying the system and interpreting the results to design artificial intelligence systems with high effectiveness and an accuracy rate of up to 100 %.[10] Based on previous studies this research hypothesizes the following H1, and H2:

H1: AI Accuracy effects positively on big data analysis.

H2: AI Accuracy effects positively on strategic Plan.

Learning Rate

The learning rate is a very important parameter that governs the speed at which the model adjusts during training and plays a pivotal role in determining how quickly or slowly the model learns from the data.[11] A high learning rate allows the model to make large adjustments to the weights which can speed up the convergence process.[12] The learning rate affects the model's ability to adapt to changing factors.[13] The more a model's ability to adapt to changing factors and problems, the more time an employee needs to learn to use it.[14] Using the system becomes more complex and requires deeper training to deal with the system's construction, which is mostly related to neural network engineering, which requires periodic learning rates to change the learning rate dynamically.[15] The results of using the learning rate measurement for AI applications are divided into two results: The first is a learning rate with low results when using AI tools and technological applications with stable performance, in which the learning rates are considered stable and high, and the second is a learning rate with high results when using complex AI application systems with neural network architectures that require more training and are considered more dynamic, but require high learning rates and continuous training courses.[16]

Based on previous studies this research hypothesizes the following H3, and H4:

H3: AI learning rate effects positively on big data analysis.

H4: AI learning rate effects positively on strategic Plan.

Inference Time

The Inference time is an AI element that refers to the time it takes for an AI model or AI application to process input data and produce output once the training phase is complete, and it is considered one of the most important elements and measurements for evaluating the efficiency of AI systems, especially in applications related to facial recognition, speech-to-text systems, and self-driving vehicles, in which delays or results are related to affecting job matters or public safety.[17] The inference time element is one of the elements that indicate the effectiveness of the system in dealing with complex data in a complex work environment with continuous dynamic changes and developments.[18] Mostly, the results of using inference time are usually high in large and complex models such as deep neural networks with lengthy calculations and require longer training time and greater accuracy in dealing with specialized devices.[18] As for the low inference time results, they indicate the rapid handling of the system and the ease of processing large amounts of data that do not require high costs or high resources or long-term training, as the nature of the system or the application of artificial intelligence does not depend on a complex engineering design or high resources.[19] Inference time is one of the most important elements of artificial intelligence that organizations must maintain its accuracy to a great extent to ensure that the applied system meets the work requirements in terms of accuracy and acceptable and appropriate time in performing work and providing services effectively and in a timely manner.[20]

Based on previous studies this research hypothesizes the following H5, and H6:

H5: AI inference time effects positively on big data analysis.

H6: AI inference time effects positively on strategic Plan.

Big Data Analysis and Strategic Plan

Big data analytics refers to the process of examining large, complex data sets to uncover hidden relationships that can impact decision-making.[21] Big data analytics includes analytical questions, machine learning, and computational tools that analyze data at high speed and transform it into actionable information and reports. It helps decision-makers make new, creative decisions, enabling organizations to improve efficiency, predict trends, enhance customer experiences, and achieve specific goals within robust, scalable data processing frameworks.[22] Big data includes various techniques and predictive analytics that can help organizations predict future outcomes and prepare to address any dynamic conditions or immediate problems that may occur.[23] It also includes descriptive analytics, which describes and explains the data used, giving managers and employees the ability to better understand the data and understand the quality, integrity, and importance of the data used.[24] Dealing with big data is considered one of the most important challenges for organizations due to the issues and problems related to storing data within databases, including the huge data, which does not require specialized experts, immediate follow-up, and high costs.[25] Most organizations that work on analyzing big data need to instill and build a culture of dealing with big data and a cognitive culture to give employees the ability to understand that making any decision or performing any work in the face of intense competition, a highly competitive atmosphere, and a changing work environment can only happen by relying on big data and not on individual decisions.[25] The strategic plan is a comprehensive organizational work map that leads to defining the vision, mission, goals, and procedures of the organization, which it seeks to achieve through the use of resources in performing activities.[26] This process includes several steps, such as defining the organization's next goal and added values, analyzing the current situation, defining measurable goals, and formulating the organization's general strategies.[27,28] The strength of the strategic plan appears in its response to the internal and external environments, analyzing strengths, weaknesses, opportunities, and threats, and its ability to formulate the goals of decision-makers and satisfy customers by building a framework for decision-making and allocating resources towards sustainability, improving operational efficiency, integrating measurable goals, contributing to improving innovation and applying new creativity.[29] It is considered one of the tools of success for organizations seeking long-term success in a competitive and evolving market due to building a high-quality approach that depends on the effective use of resources with low costs based on creative ideas.[30]

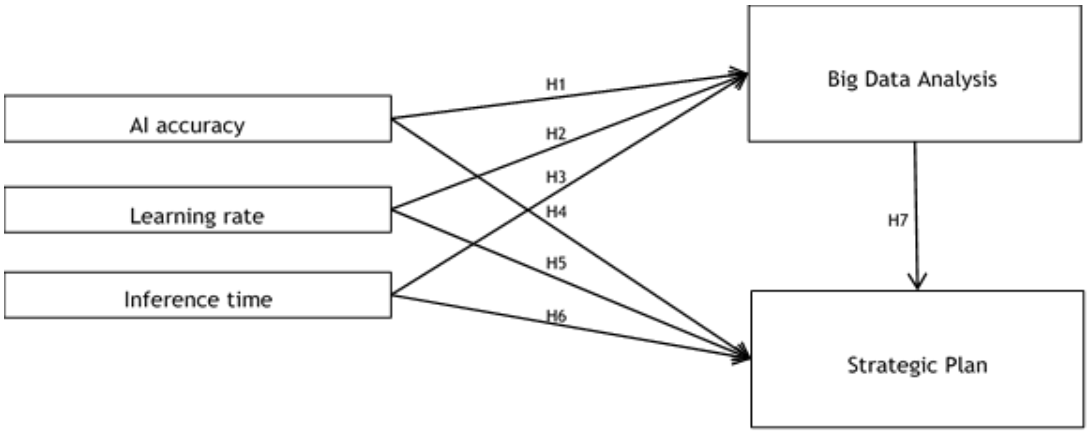

Figure 1. Theoretical Model

METHOD

This study aimed to measure the impact of artificial intelligence accuracy, learning rate and inference time on enhancing and developing big data analysis and strategic plans at Zain Jordan Telecommunications Company. A questionnaire consisting of 25 questions was designed to measure the impact and change of the study and was distributed within the study community to managers, department heads and employees. 163 valid questionnaires were retrieved for analysis. The PLS-SEM system was used by relying on the use of several measurement tools to evaluate the respondents' responses to the questionnaire questions. Among these tools, the arithmetic mean and standard deviation, AVE value, T value, P value were used to measure the reliability of the research, and Kronpach's alpha to measure the reliability of the research. This research is expected to obtain broad and detailed knowledge about the impact of independent research variables, which are represented by the accuracy of artificial intelligence, learning rate, and inference time, on dependent research variables, which are big data analysis and strategic plans, to help this research in providing valuable recommendations capable of enhancing competitive capabilities and operational efficiency in the telecommunications sector in Jordan.

Research Design

This research identified and outlined the main objectives by designing a questionnaire with a total of 25 questions divided into five main sections to measure the impact of the accuracy of artificial intelligence and learning rate techniques at the time of inference in improving and enhancing big data analysis and building strategic plans. The Smart PLS system was used to analyze all the data retrieved and to discuss and confirm or deny the basic study hypotheses. A five-point scale was used with each question and using a strongly differ, disagree, neutral, agree, and strongly agree sign. This is considered a systematic procedure that enables us to know all the information and knowledge we need and search for about the links and impact between the independent and dependent study variables.

Data Analysis

The answers to the research questionnaire were converted into usable codes. A smart BLSM system was used to enter all the retrieved data and ensure the accuracy of the data set and its documentation by examining all stages of its application. The entry was done in order to try and apply any error in the data and try to process it. All the retrieved questionnaires were then examined accurately to ensure the validity of the questionnaires for analysis. Measurement tools were used to verify the results of the data analysis and verify the validity of the assumptions and experimental factors. There is inference and accuracy of artificial intelligence. Before moving to the evaluation, data purification and function verification were used and cases that showed a high standard deviation were identified. In addition, it was confirmed that all the retrieved data showed a good normal distribution. Finally, the reliability and validity of the study were confirmed, which showed that there were no undesirable results in this logic. Certainty is evidence that the results of statistical and theoretical investigations proved it by studying the effectiveness of its independence and represented by the accuracy of artificial intelligence to contain learning at the time of inference. It has statistical and theoretical results with a high impact on the diversity of research to determine and represented by the analysis of big data and research planning.

Measurement Model Assessment

The author of this study delves into the impact of five main components, namely, the accuracy of artificial intelligence, learning rate, inference time, big data, and strategic planning. The accuracy of the results will be ensured by completing the physical measurements through pre-processing before conducting the theoretical analysis.

Table 1. Reliability and Validity Test

Code	Variable	Factor's Loading	VIF
AI accuracy (AIA)	(Chronbach's Alpha: 1,218 , CR: 1,122:, AVE: 2,437)		
AIA1	Precision	1,211	1,259
AIA2	Recall	1,210	1,277
AIA3	F1 Score	1,234	1,665
Learning rate (LR)	(Chronbach's Alpha: 1,239, CR: 1,211, AVE: 2,211)		
LR1	Initial Learning Rate	1,252	1,554
LR2	Decay Rate	1,221	1,443
LR3	Adaptive Learning Rate	1,249	1,642
Inference Time (IT)	(Chronbach's Alpha: 1,223, CR: 1,225, AVE: 2,453)		
IT1	Model Latency	1,220	1,335
IT2	Throughput	1,257	1,437
IT3	Real-Time Processing Capability	1,248	1,432
Big Data Analysis (BDA)	(Chronbach's Alpha:1,265, CR: 1,432, AVE: 2,332)		
BDA1	Data Volume	1,119	1,538
BDA2	Data Velocity	1,299	1,429
BDA3	Data Variety	1,288	1,328
Strategic Plan (SP)	(Chronbach's Alpha:1,225, CR: 1,430, AVE: 2465)		
SP1	Goal Alignment	1,217	1,522
SP2	Resource Allocation	1,325	1,337
SP3	Performance Metrics	1,466	1,346

The researcher can observe the consistency of the other elements by tracking the strength of the variable within the structure of the study. When the elements that show greater external results are taken into account, the elements become more consistent and similar. The results or values of AVE should be higher than zero point five zero when assessing the validity of convergence. This ensures that the number reflects the basic framework of the idea, which represents more than 50 % of the average variance as a type of originality of the structure. The convergence is evaluated by examining the chances of the importance of the average variance extracted, also known as the average variance. When considering the association between the values of the elements, the mean is evaluated. Distinct variables are evaluated using statistical methods. In evaluating a particular approach, it is important to pay attention to any contradictions or gaps that may saturate the things and the measure under consideration. One strategy that can be used to assess convergent validity is to look at the associations between the main variables of the study and maintain a level of precision similar to the level of precision through component analysis. This requires confirmation of originality through the use of composite reliability (CR) and average variance extracted (AVE).

Research hypotheses Test

Looking at how the relationships discussed in the following section may influence the relationships is the second step in confirming the study's hypothesis. The current debate is on whether or not further research into this effect is necessary. An M-shaped moderator variable can alter the strength of the correlation between two variables by changing the way the independent and dependent variables interact with one another. Each of the fully-supported search hypotheses has an effect and is related to the others in the table below.

Table 2. Path Coefficient Test Results

	Research Hypotheses Test	P Value	Results
H1	AI accuracy (AIA) -> Big Data Analytics (BDA)	0,002	Supported
H2	AI accuracy (AIA) -> Big Data Analytics (BDA)	0,001	Supported
H3	Learning Rate (LR) -> Strategic Plan (SP)	0,001	Supported
H4	Learning Rate (LR) -> Strategic Plan (SP)	0,000	Supported
H5	Inference time (HC) -> Big Data Analytics (BDA)	0,000	Supported
H6	Inference time (HC) -> Strategic Plan (SP)	0,002	Supported
H7	Big Data Analytics (BDA) -> Strategic Plan (SP)	0,006	Supported

DISCUSSION

Based on the results of the study, the multiplicity of artificial intelligence is one of the most important factors in the telecommunications sector in Jordan that affects the improvement of the performance of big data analysis and the construction of strategic plans. According to this result, the increased use of artificial intelligence accuracy is linked to and gives a better success effect for companies, which proves the first main hypothesis of the study. Artificial intelligence is one of the most important elements due to its impact on improving operational efficiency and strategic decisions. Jordanian telecommunications companies face risks related to the lack of operational effectiveness and the need to continuously train employees to keep pace with the development taking place in the information technology sector and to learn the services provided to customers. Artificial intelligence accuracy works to give employees the education, experience and continuous training they need, which affects the enhancement of employees' capabilities in analyzing big data and helping managers in building long-term strategic plans. The results of the study are consistent with the results of the following previous studies.[31,32,33,34] The study also shows that the independent variable, the learning rate, directly affected the performance of big data analysis and the construction of strategic plans, which gives these data and results a great impact and credibility to the idea that the application of technological tools such as artificial intelligence tools can improve and raise the learning rate for employees. Thus, the second hypothesis is accepted and does not clarify more clearly that the learning rate directly affects big data analysis and the construction of strategic plans. The presence of a high level of learning rate allows managers and employees to be able to continue performing business and general performance, solve problems and obstacles, and work together effectively and quickly. Thus, a network of relationships, trust, and knowledge structure is mixed within organizations. These results are consistent with the results of the following studies.[35,36,37,38,39,40,41] The results and conclusions of this study are expanded by taking the effect of reasoning time on enhancing and raising the performance of big data analysis and building strategic plans. The study showed that the reasoning time variable directly affects improving and enhancing big data analysis and strategic planning by reducing repetition and the time needed by the employee to perform work, which increases the quality of services provided to customers and competitive capabilities. This study is consistent with the results of the

following studies.[42,43,44] Finally, the study showed that improving and raising the performance of big data analysis through the use of the accuracy of artificial intelligence, learning rate and reasoning time directly improves the building of strategic plans, supporting decision-makers in making the right decisions, interacting with customers, responding to market needs, seizing new innovative opportunities and wasting the ability of companies in the highly competitive communications sector to withstand, continue and possess competitive advantages over other competitors.

Future Suggestions

Focus on this new study and start working on exploring AI models and blood university real-time analysis and corporate clients added to that to explore AI for network management. Internet services Daytona services operational efficiencies loss of customers specialized in marketing overall business performance.

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FUNDING

The authors express their sincere gratitude to the Applied Science Private University for their valuable support and collaboration. Additional appreciation the authors extend their appreciation to the Deanship of Scientific Research at King Khalid University for funding this work through Large Research Groups under grant number (RGP.2 / 68 /46).

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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