



ROLE OF ARTIFICIAL INTELLIGENCE IN BUSINESS INTELLIGENCE AND DECISION MAKING: AN EMPIRICAL STUDY

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Abstract

Artificial intelligence is a quickly growing subject getting more attention in the business world (AI). The usage of artificial intelligence has already spread to many areas of daily life and industry. The use of AI in business may push the industry to rely on more efficient, affordable, and precise marketing strategies. A company owner may boost audience response and create a significant competitive edge over other online businesses by using this AI in business strategy. Along with advertising, it can restructure a company using innovative ideas. Also, it offers answers for complex issues, contributing to excellent company growth. Business intelligence (BI) seems no longer feasible for monitoring any day-to-day physical stores of enterprises due to the increasing amount of data given today and the overflow of its volume caused by the vast quantity of data developing to the scale of big data. To present a suitable decision-making methodology quickly enough to be classified as real-time, a technique that we used to call BI, evaluating the enormous volumes of data that include the data is becoming challenging. The study had considered 204 people from different occupational sectors to know the factors that determines the Role of Artificial Intelligence in Business Intelligence and Decision making. It is found through the study that Efficiency and Automation, Decision-making, Problem solving and Growth and productivity are different factors that determines the role of Artificial Intelligence in Business Intelligence and Decision making.

Keywords: Marketing, Artificial intelligence, Decision-making, Operations

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1. Introduction

Presently, AI is having a significant impact on global sustainability trends. It might pave the way for the peaceful coexistence of humans and robots or herald a nightmarish future marked by war, poverty, and misery. Moreover, it would hasten our advancement toward the UN Sustainable Development Goals (SDGs). In this framework, the SDGs outline the global development objectives, and AI is quickly creating new opportunities in business, industry, health, education, the environment, and the space industry. As a result, via experimentation and programs for sustainable management and leadership, AI has been implemented into the SDGs in a variety of ways. Hence, many nations have started to develop national AI policies.

Spangler (2001) found that Decision making is a basic human behavior that can have significant consequences. The fact that academics have attempted to improve human capacities via computer technology development is unsurprising. Some applications have succeeded in achieving this goal thanks to artificial intelligence (AI) improvements. "Intelligent systems for decision support (IDSS)," also known as AI-integrated decision support systems, are used more often to help decision-making in various fields, including banking, medicine, business, control and management, and cybersecurity. In this study, we investigate the current AI methods applied in IDSS. "Several terminologies, including Active DSS, Knowledge-Based DSS, Expert Systems, Autonomous Decision Systems, and Joint Cognitive Systems, are used to describe these systems in the literature" (Vasanthi & Palanivelu. 2020).

Prem & Karnan. (2013) examined that Intelligent systems are ones that in some way resemble human cognitive ability. These systems use AI approaches to analyse, learn, recall, anticipate, and explore. To find relevant data from incredibly huge and dispersed data sources and to apply analytical procedures to large volumes of data, for example, AI technologies can be utilized to augment human skills, trying to produce generalized answers from principles and facts and figures, and identify correlations in knowledge coming from various spots that could influence a decision. Technologies like machine learning, fuzzy logic, virtual assistants, agent teams, situation computing, machine learning, and pattern classification can help assess and select the assessment and selection of choices when used in cooperation with systems that assist with decisions. These systems are beneficial for complex, ambiguous, non-deterministic problems. (Hakimpoor et al. 2011)

2. Literature Review

Buntak et al., (2021) found that Any of these Systems that provide strong computing capability may include AI technology. These are a few notable examples demonstrating the range of subjects and AI techniques used in newly released IDSS apps. As can be seen, the applications relate to decisions that affect people's lives and are helpful, including those for clinical and professional decision-making. Nonetheless, the wide variety of uses includes routine jobs like maintaining the electricity system and responding to emergencies. AI technologies are necessary for these systems to function intelligently and help human decision-making. Even though other AI techniques are documented in academia, we will concentrate on three of the most important ones: Intelligent Agents, Fuzzy Logic, Simulated Annealing, and Artificial Neural Networks (Stone et al., 2020).

Zohuri, (2020) revealed that Even while "artificial intelligence" is becoming increasingly common, it still lacks a clear definition. Imbuing computers with intellect (also known as artificial intelligence, or AI) gives them the ability to think for themselves and act sensibly in response to their surroundings. In a technical sense, artificial intelligence is integrating various business operations, systems, and processes with virtualized environments, network gadgets, robots, computers, and digital content creation. Computers now use artificial intelligence and will continue to in the future. Future marketing plans must consider the growth and development of artificial intelligence. AI software is commonly used in commerce to automate processes, save costs, speed up response time, and boost productivity. Technology is developing astoundingly, and businesses that have already shifted their emphasis to product creation will profit immensely from the next breakthrough.

Barnea, (2020) studied and found that The rapidly expanding role machine intelligence (AI) serves in modern digital life is not an exception and is present in both the marketing and advertising industries. "Artificial intelligence is transforming industries one by one, from the witty and intelligent Siri to Tesla's self-driving cars to Google AI, which can learn online games in only a few hours." Ai technology can be used for many things, like identifying graphs and charts to lower market risks, strengthening customer experience with automated virtual assistants, or even looking through millions of data files on different servers throughout an organization to find compliance failures. However, organizations have only lately begun to see the promise that machine learning and (AI) may provide for the business of tomorrow. Artificial intelligence uses self-learning systems by utilizing tools like data collection, pattern recognition, and processing natural languages. So, compared with

human intelligence in light of its fundamental economic advantages, artificial intelligence is highly scalable and results in dramatic cost savings. Also, the consistency of rule-based programming and artificial intelligence aids firms in minimizing errors. Its durability, regular updates, and the ability to record operations create favorable economic possibilities (Soni et al., 2020).

Vizgaitytė & Skyrius. (2012) found that Artificial intelligence applications use robotics, computer vision, speech recognition, machine learning, and natural language processing technology. These technologies offer several commercial prospects. Artificial intelligence may be obtained through machine learning, and deep learning is one of its branches and a way to understand machine learning. Deep learning emphasizes algorithms that are fashioned after the composition and operations of the nervous system. The use of cutting-edge information has significantly impacted marketing, just as it has on every other industry, and will do so going forward. AI has undoubtedly enhanced marketing efficiency in several ways. As seen by the use of robots instead of sales associates and the automatic updating and reinstalling of websites employing eye-tracking data, it is projected that the impact of (AI) will grow shortly. Without a doubt, when significant marketing trends originate from AI, marketing research will change and lose significance. The marketing world is rapidly transforming due to AI advances and improvements, and this trend will continue (Fahad & Alam. 2016). The rate of change will also affect how marketing is viewed in research, academia, and business. Adapting to the shifting marketing landscape will be a significant task for enterprises. With the development of new technologies, businesses will need to train their staff continually. Dealing with AI is not considered science fiction but rather a reality that will become essential for survival (Curzon. Et al., 2021).

Bankins. (2021) Studied that modern business processes create and consume an increasing amount of data (big data) to enable flexible business environments and adapt to the changing demands of business users. They become increasingly case-focused and rule-based oriented. As a result, they are concentrating on procedures for making business decisions and ongoing process development of the processes themselves and business activity execution. AI technology may be used to make these advances across the forecast-conclude-behave cycle.

Agarwal, Gans & Goldfarb. (2019) revealed that The four primary stages of the business decision-making process are knowledge, design, choice, and operation. During the intelligence phase, information is gathered and the issue is identified. A suitable model is created based on the criteria during the design phase, and specific alternatives are

investigated. The best solution is chosen from among the available options at the decision step. The last process involves implementing and testing the chosen option. Phases are connected and linked consecutively through feedback loops.

Bernal. (2016) examined that Although the algorithm's intake is unstructured data, adding AI tools enables reasoning, learning, recalling, scheduling, and analysis from exceedingly broad and distributed data sources. Connectivity with numerical and/or prediction tests enables knowledge extraction from historical data and rule-based or case-based decision-making, replicating human reasoning, intuition, and common sense. These systems are versatile because they have direct access to experts and the capacity to capture, improve, store, and apply information. It is possible to solve complicated business challenges with more precision and dependability. The use of fabricated neural networks, fuzzy logic, bright agents, representative teams, case-based thinking, genetic software development, developing computation, ant colony improvement, and particle swarm improvement are a few of the intelligence approaches that offer inventive ways to develop and re-design company's processes. Artificial intelligence (AI) technology incorporated into company processes has an impact on how a responsible party evaluates and makes choices. AI approaches use various technologies to hasten automated decision-making (Chen & Biswas. 2021). In 1950, the first Artificial Intelligence (AI) system development projects are launched. With the emergence of the programme, some questions concerning its use and implementation have also surfaced. Hence, scepticism has led to a "AI winter," which significantly slows the pace at which AI evolves. The absence of computer systems and technology is a problem for AI development in its early stages. Also, the speed of such systems presents a problem since it is insufficient. The artificial intelligence (AI) research is accelerating along with the advancement of computer research and computers in general. Data gathering and processing were the main responsibilities of the AI system used by the United States Military Department, which was the first organization to employ AI. AI first appeared in the world of video game industry in 1990. This year, a crucial turning point for AI and its adoption occurred when AI chess programs demonstrated it could defeat human beings in the game of chess. AI has shown great promise since it started to be utilised in the gaming industry. It has laid the groundwork for the regular functioning of many other technological advancements, including drones and all other automated procedures. AI is now frequently used in an assortment of study areas where the ability to analyze enormous quantities of data serves as the

foundation for decision-making as a result of its rising appeal (Griiya. 2023).

Advances in AI are principally responsible for the emergence of Industry 4.0 and the increased effectiveness of all other technological developments. There is sufficient research evidence to show that AI technology opens up novel options with the ability to profoundly change businesses and the whole capitalist model. AI has several benefits for business, including the fast identification of patterns in vast amounts of data, quick presentation and insights, improved product design, the giving of deep insights, and many others. These benefits ought to lead to increased profit margins, business growth, increased productivity, and more cost-efficient cost structures. Modernity Economic, a new growth economics, is used in this study to analyse the implications of AI on business.

Alarefi, (2022) found that the technology, tools, systems, and programs that make up business intelligence (BI) are used to compile, analyse, combine, and display business reports while actively executing business decisions. Indefinite assistance will be provided in gaining, understanding, and controlling their data in order to advance decision-making for creating corporate processes and procedures. Moreover, BI may be defined as a company's capacity to transform daily data gleaned from business operations and procedures into information that is useful. Business intelligence (BI) is essential for helping decision makers get the information they need to make quicker, more accurate, and more efficient decisions. Additionally, BI may support and enhance the efficacy of operational standards and their impact on corporate management, planning, and economic tracking,

which results in better strategy options in dynamic business settings. Among many other advantages, BI may enhance decision-making processes, highlight possible dangers, uncover new business possibilities, and improve organisational performance.

Objective

1. To know the factors that determines the Role of Artificial Intelligence in Business Intelligence and Decision making.
2. To know the impact of Artificial Intelligence on Business Intelligence and Decision making.

3. Methodology

The study had considered 204 people from different occupational sectors to know the factors that determines the Role of Artificial Intelligence in Business Intelligence and Decision making. The data of this study was collected through “random sampling method.” The data was analysed by EFA and MRA tools to get the results.

Findings

Table below is sharing general details of the respondents. In total 204 respondents, males are 60.3% and females are 39.7%. Among them 31.4% are below 40 years of age, 43.6% are between 40 to 45 years of age, 25.0% are above 45 years of age. 11.35 of the respondents are working for media platforms, 20.1% are from health care sector, 19.1% are from hospitality sector, 27.9% are from banking, 17.6% from finance and rest 2.4% are from other occupational sectors.

General Details

Variable	Respondents	Total Percentage
Gender		
Males	123	60.3
Females	81	39.7
Total	204	100
Age		
Below 40 yrs	64	31.4
40-45 yrs	89	43.6
Above 45 yrs	51	25.0
Total	204	100
Occupational sector		
Media platforms	23	11.3
Health care	41	20.1
Hospitality sector	39	19.1
Banking	57	27.9
Finance	36	17.6
Others	5	2.4
Total	204	100

“Factor Analysis”
“KMO and Bartlett's Test”

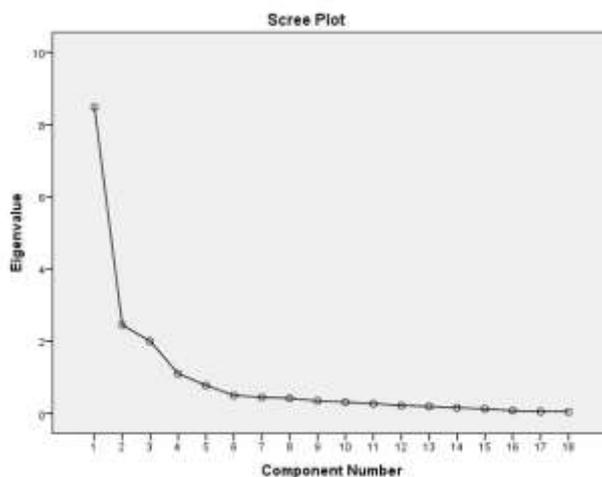
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	3516.568
	df	153
	Sig.	.000

In table above “KMO and Bartlett's Test” above, KMO value found is .880.

“Total Variance Explained”

“Component”	“Initial Eigenvalues”			“Rotation Sums of Squared Loadings”		
	“Total”	“% Of Variance”	Cumulative %	“Total”	“% Of Variance”	Cumulative %
1	8.485	47.141	47.141	4.314	23.966	23.966
2	2.450	13.613	60.753	3.586	19.922	43.888
3	2.003	11.128	71.881	3.247	18.040	61.928
4	1.107	6.148	78.029	2.898	16.100	78.029
5	.779	4.326	82.355			
6	.501	2.784	85.138			
7	.447	2.483	87.621			
8	.419	2.329	89.950			
9	.348	1.934	91.884			
10	.312	1.731	93.615			
11	.274	1.521	95.136			
12	.221	1.227	96.363			
13	.192	1.069	97.432			
14	.160	.889	98.321			
15	.124	.691	99.012			
16	.077	.430	99.443			
17	.054	.301	99.743			
18	.046	.257	100.000			

All the 4 factors explain total 78% of the variance. The variance explained by first factor is 23.966% followed by the second Factor with 19.922%, third Factor having 18.040% and fourth factor explains 16.100% of variance.



Above is the Graphical presentation of the Eigen values obtained from the Total Variance Explained table.

Factor and Variables

S. No.	Statements	Factor Loading	Factor Reliability
	Efficiency and Automation		.961
1.	AI maintains the electricity system and respond to emergencies automatically	.843	
2.	Used to compile, analyse, combine, and display business reports	.828	
3.	AI is used for quick presentation and visions to improve product design	.813	

4.	Helps in fast identification of patterns in vast amounts of data	.809	
5.	Produce generalized answers from principles and facts and figures	.783	
	Decision-making		.910
6.	AI-integrated decision support systems are used in clinical and professional decision-making	.906	
7.	Helps in selection process when used in cooperation with systems that assist with decisions	.869	
8.	Advance decision-making to create corporate processes and procedures	.855	
9.	Helps decision makers to get information for quick, accurate, and efficient decisions	.636	
10.	Makes decision on the basis of ongoing process development and business activity execution	.609	
	Problem solving		.894
11.	AI systems are beneficial for complex, ambiguous, non-deterministic problems	.852	
12.	AI answers complex issues and contribute to excellent company growth	.848	
13.	Solve complicated business challenges with more precision and dependability	.842	
14.	Identify correlations in knowledge coming from various spots	.739	
	Growth and productivity		.841
15.	AI restructure a company using innovative ideas	.864	
16.	Boosts audience response and create a significant competitive edge	.845	
17.	Increase business growth and productivity through technological developments	.830	
18.	Lead to increased profit margins, business growth, productivity and cost-efficient structures	.677	

Development of the factors

1st factor is Efficiency and Automation which includes the variables like AI maintains the electricity system and respond to emergencies automatically, used to compile, analyse, combine, and display business reports, AI is used for quick presentation and visions to improve product design, helps in fast identification of patterns in vast amounts of data and produce generalized answers from principles and facts and figures. 2nd factor is named as Decision-making and its associated variables are AI-integrated decision support systems are used in clinical and professional decision-making, helps in selection process when used in cooperation with systems that assist with decisions, Advance decision-making to create corporate processes and procedures, helps decision makers to get information for quick, accurate, and efficient

decisions and Makes decision on the basis of ongoing process development and business activity execution. 3rd factor is Problem solving which includes the variables like AI systems are beneficial for complex, ambiguous, non-deterministic problems, AI answers complex issues and contribute to excellent company growth, solve complicated business challenges with more precision and dependability and Identify correlations in knowledge coming from various spots. 4th factor is Growth and productivity which includes the variables like AI restructure a company using innovative ideas, boosts audience response and create a significant competitive edge, Increase business growth and productivity through technological developments and Lead to increased profit margins, business growth, productivity and cost-efficient structures

“Reliability Statistics”

“Cronbach's Alpha”	“N of Items”
.927	18

Table above is showing the reliability which is 0.927 of all the 18 items that includes the variables related to role of artificial intelligence in business intelligence and decision making.

MRA “Model Summary”

“Model”	“R”	“R Square”	“Adjusted R Square”	“Std. Error of the Estimate”
1	.776	.602	.594	.55112

a. Predictors: Efficiency and Automation, Decision-making, Problem solving and Growth and productivity

In Multiple Regression analysis, the value of Adjusted R square is 0.602 with 59% of the variation.

“ANOVA”

“Model”		“Sum of Squares”	“df”	“Mean Square”	“F”	“Sig.”
1	“Regression”	91.493	4	22.873	75.307	.000 ^b
	Residual	60.443	199	.304		
	Total	151.936	203			
DV: Overall impact of Artificial Intelligence on Business Intelligence and Decision making						
b. Predictors: (Constant), Efficiency and Automation, Decision-making, Problem solving and Growth and productivity						

The table above that significance value is less than 0.05 which reflects that one or more of the IDVs significantly influences the DV.”

“Coefficients”^a

“Model”	“Unstandardized Coefficients”		“Standardized Coefficients”	“t”	“Sig.”
	“B”	“Std. Error”	“Beta”		
(Constant)	3.623	.039		93.882	.000
Efficiency and Automation	.081	.039	.094	2.099	.037
Decision-making	.089	.039	.103	2.303	.022
Problem solving	.110	.039	.127	2.840	.005
Growth and productivity	.651	.039	.753	16.836	.000
DV: Overall impact of Artificial Intelligence on Business Intelligence and Decision making					

Table above is showing that all the factors namely Efficiency and Automation, Decision-making, Problem solving and Growth and productivity are having significant impact on Overall impact of Artificial Intelligence on Business Intelligence and Decision making. Highest impact is shown by Growth and productivity with beta value 0.753 followed by Problem solving (.127), Design and management of energy system (0.103) and Efficiency and Automation with beta value 0.094.

4. Conclusion

The use of artificial intelligence into company operations speeds up transaction processing, reduces mistakes, improves transparency, and significantly boosts income. Although it is very hard to predict where this technology may lead to the creation of new employment in the future, it is simple to understand how it can benefit people. AI enhances decision-making by automating particular activities and by giving decision-makers access to more precise and up-to-date information. Because of this, decision-making is quicker, which can improve the efficiency of structures that oversee undertakings as a whole. Artificial intelligence may also speed up a variety of decision-making procedures, giving decision-makers more time to focus on other crucial duties. AI also improves decision-making precision by providing up-to-date and correct facts. As a result, errors are reduced and decisions are based on the most relevant information available. By ensuring that decision-makers have access to all pertinent facts, AI may also help to enhance decision-making

processes. This ensures that decisions are neutral and supported by good evidence.

It is found through the study that Efficiency and Automation, Decision-making, Problem solving and Growth and productivity are different factors that determines the Role of Artificial Intelligence in Business Intelligence and Decision making. The study concludes that there is significant impact of Artificial Intelligence on Business Intelligence and Decision making.

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