THE EFFECTS OF ARTIFICIAL INTELLIGENCE ON THE BANKING SECTOR IN INDIA: A CASE STUDY OF SELECTED HYDERABAD BANKS

SHAMINI REDDY POLICE ASSISTANT PROFESSOR,SN VANITA MAHA VIDYALAYA, NAMPALLY,HYDERABAD,TELANGANA,INDIA.

Abstract:
Artificial intelligence is being used by many different sectors in today's highly competitive business environment. This trend is quite likely to continue. This tendency toward more specialization has been spurred by the intense level of competition in the economic sector. This is especially true in the financial services sector. This is particularly true in the business world's commercial and financial sectors. Banks and other financial institutions have been forced to rethink their approaches and embrace AI-based innovations since the emergence of AI and the numerous benefits it delivers. One of the means through which this has been accomplished is by using blockchain technology. As a result, there has been a proliferation of AI–driven financial technology. This is only one of the many immediate effects of AI advancements. One method that has shown success towards this end is the use of block chain technology. The widespread support it has received in the banking industry has led to the consolidation of financial institutions, the expansion of online banking services, and the maintenance of a steady flow of cash. We will achieve this by combining information from several sources. The research also seeks to identify the potential role that AI may play in these processes. The study may have used data supplemented from reliable sources like yearly reports, academic papers, or books. Statistical methods such as the paired-samples t-test, canonical correlation, and multiple regression were used to examine the information quantitatively. Next, we analyzed the findings from our investigations.

Keywords: Banking Performance, Artificial Intelligence,

INTRODUCTION
Recent developments in the financial industry, such as central banking and payment systems, have helped improve the effectiveness of risk management. These shifts might be seen. These new findings may turn out to have a positive impact. These shifts have been increasingly pronounced during the last several years. It's very feasible that the organization will make significant progress because of everything that's been happening and advancing. These kinds of developments may be seen in any of these many centers of interest and activity. Such front- and back-end upgrades are now in development, and each offers solutions to issues that were previously handled by the finance department or the board of directors. They are also being developed for front- and back-end applications. Recently, the notion of constructing an artificial consciousness by the use of computer programming has attracted a lot of attention in the area of business management accounting. The attention paid to this problem has skyrocketed in recent years. Research in this field of study focuses mainly on the ties that establish between the various company kinds and the clients they service. High hopes are being placed in artificial intelligence (AI), and its reception is being viewed as the fourth major uprising of our time. As with any major technological advancement, it comes with its own set of advantages and disadvantages. There are some applications out there or in development that could change the way administration is done. Microsoft India predicts that by 2023, AI will be the single most important driving force in accelerating the rate of innovation-driven value enhancements (by 2.2 times) and worker usefulness benefits (by 2.3 times). The value of artificial intelligence innovations has skyrocketed as their development has accelerated. After demonetization, the Indian banking sector aggressively embraced AI technology. AI is being used in the financial sector, as well as its suggestions and affects on the financial execution of some public and private sector business banks in India with respect to revenue pay.

Review of Literature

Akhilesh Bavandlapalli (2023) examines the areas in which machine intelligence is being introduced in banks and applications of AI in significant commercial banks in India in her research paper, "How Artificial Intelligence is altering the banking sector - A case study of top four Commercial Indian Banks."

Traditional banking is improving, and banks are increasingly implementing cutting-edge technologies like blockchain, cloud computing, and AI. However, banks have not yet reached the stage of the AI revolution, and the human touch is still crucial. The Indian banking industry is learning how to employ AI in a way that will soon improve customer service and the way that banks operate.

In their study article Optimizing portfolio creation using artificial intelligence, Chan Kok Thim and aim to increase the usefulness of Artificial Intelligence by applying Neural Network (NN) in the real market. In order to replicate and enhance portfolio development, this paper summarised the standard Markowitz Theory's Efficient Frontier. It also built up a neural system heuristic to help readers better understand how Artificial Intelligence can develop ideal portfolio capacity and provide yields to all levels of financial specialists.According to Dr.Naveen Prasadula study "Utilization of Artificial Intelligence in Finance," man-made artificial intelligence is currently entering its third boom stage in history as a result of a scientific development called profound learning. Artificial intelligence is employed in a variety of structures, including the financial sector. Financial institutions should employ human consciousness more efficiently by using techniques like open innovation.

Artificial Intelligence Technology In Banking And Finance

Personalized Financial Services

As automated financial counsellors and planners offer their knowledge in making financial decisions, personalised connect will reach new heights. They provide recommendations on equities and bonds after analysing market sentiment in relation to the user's financial objectives and personal portfolio.

Statement of Problem:

Given the massive amounts of data that come with the operational financial framework, it is currently considered excessive to make a decision. This occurs because there is either insufficient data or incorrect data on the organizational structure. This is so because the choice will be informed by the data collected. This is because the referenced data already exists at the specified location. The AI system will anticipate these problems and react accordingly by sifting through data in order to handle the reports efficiently. It achieves this purpose by making use of real-time data, which enables timely decisions and facilitates management in accordance with the principles and rules.

Objectives of Research:
1   To study the aim of cataloging the many uses of AI in the banking sector.
2   To analyze the impact that AI has on the efficient execution of economic plans.
3   To determine if or not there is a correlation between the usage of AI and the interest income of certain banks.

Techniques and Methodology:

Numerous research methods, both descriptive and explanatory, were used over the course of this examination. Secondary data were collected from reliable sources like financial institutions' annual reports for this investigation. We used the data from these publications. The study in question was conducted in the India. The articles were only one of several sites we mined for information; the sources themselves were rather diverse. We used statistical methods including the Paired Samples T-Test, Correlation analysis, and Regression analysis to check the data and make sure it was correct.

Research Hypothesis:

Ho: No statistically significant correlation was found between the percentage of banks using AI and their percentage of interest income.

H1: The percentage of banks using AI is correlated with the interest income of the selected banks.

Discussions Based on Empirical Findings

Analysis and Content

The 8-Parameters of AI included in this assessment were selected from among those made public in the sample bank's annual report. Those that implemented the selected AI border into their daily company operations get a 1 from the banks, while those who did not receive a score of 1 are disqualified.

Parameter of Artificial Intelligence:

Artificial Intelligence Parameter	No
Customer Interface	I
Customized Financial service	II
Digitalization of Branch	III
Business Strategy Insights	IV
Data Driven- Lending Decision	V
Fraud detection	VI
Robotic Process Automation	VII
VRM	VIII

Artificial Intelligence Score:

Name of the Bank	I	II	III	IV	V	VI	VII	VIII	Total	Normalised Score
HDFC	1	1	1	1	1	1	1	1	8	100
SBI	1	1	1	1	1	1	1	1	8	100
ICICI	1	1	1	1	1	1	1	1	8	100
AXIS	1	1	1	1	1	1	0	1	7	87.5
BOB	1	1	1	1	1	1	1	0	7	87.5
PNB	1	0	1	1	1	1	0	0	5	62.5
CNB	1	0	1	1	1	1	1	0	6	75
KMB	1	1	1	1	1	1	1	1	8	100
BOI	1	1	1	1	1	1	0	0	6	75
UBI	1	1	1	0	1	1	0	0	5	62.5
FB	1	0	1	1	1	1	0	1	6	75
IB	1	0	1	1	1	1	0	0	5	62.5
IOB	1	0	1	0	1	1	1	0	5	62.5
UCO	1	1	1	0	1	1	0	0	5	62.5
CBI	1	0	1	0	1	1	1	1	6	75
IDBI	1	0	1	1	1	1	1	0	6	75

AI SCORE
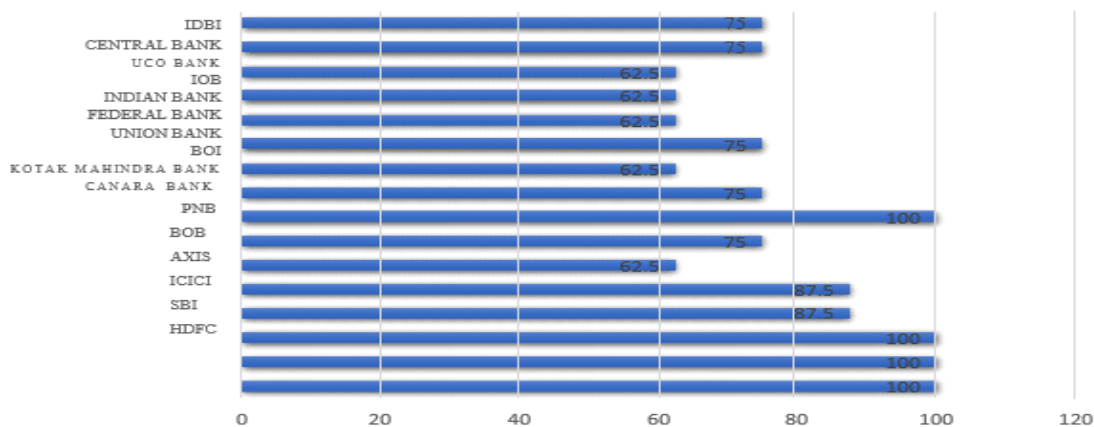
According to the data presented in the table and chart above, four of the model banks rely entirely on electronic thought for their business operations, two rely on human knowledge for 87.5% of their tasks, five rely on human intelligence for 75%, and six rely on mechanized thought for only 62.5%. As a result, it's clear that banks are increasingly relying on AI-generated data in their daily operations.

Paired Sample T-Test

Null Hypothesis (H0): When comparing interest income, there is no difference.

Alternative Hypothesis (H1): The Interest Income Gap here is negative and not equal to zero.

Comparing Interest Payments Before and After Demonetization Using a Paired Samples T- Test

Statistics for Paired Samples

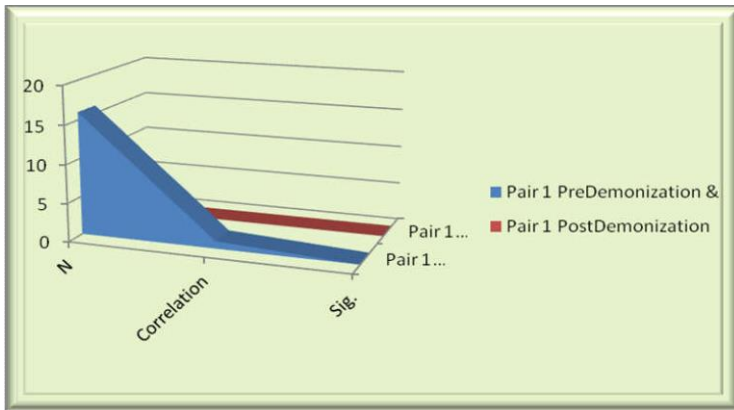|	**Mean**	**N**	**Std. Deviation**	**Std. Error Mean**
Pre-Demonetization	46397.44	16	49375.335	12343.834
Pair 1				
Post-Demonetization	59390.69	16	63671.309	15917.827

According to the data shown above, the average value of interest payments made before and after the demonetization of currency is 46,397.44 and 59390.69, respectively. Interest payments clearly increase in value from before demonetization to after.
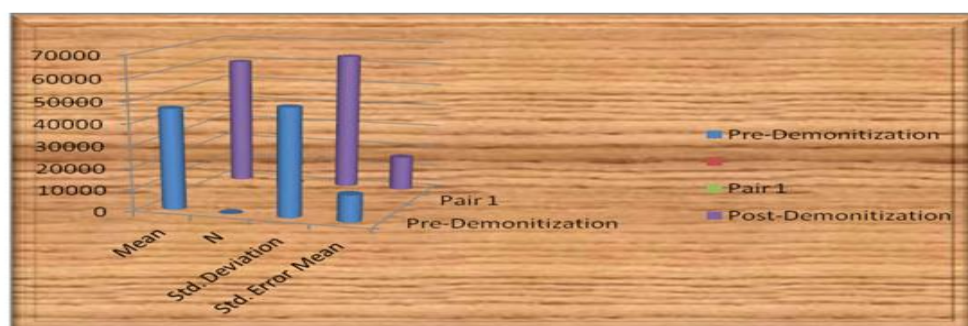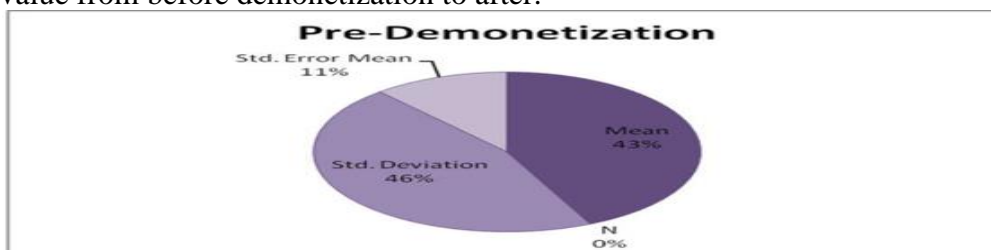
Based on the data in the table above, we can infer that the difference in interest income before and after demonetization has a significant positive link (r = 0.972). Since the 0.000 p-value obtained from the table is less than the threshold value of 0.05, (=0.05> p=0.000) Ho is rejected, showing that there is a significant difference between the Interest pay of Pre-Demonization and Post- Demonization.
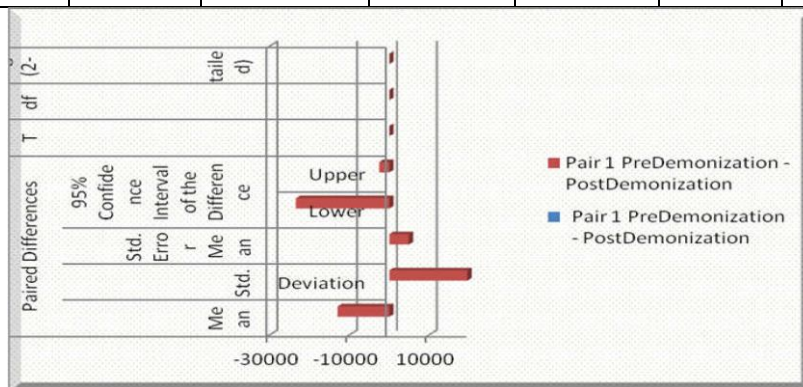
Paired Sample Test

		N	Correlation	Sig.
Pair 1	Pre Demonization & Post Demonization	16	0.972	0.000

Paired SampleTest

		Paired Differences					T	df	Sig. (2- tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval ofthe Difference				
					Lower	Upper			
Pair 1	Pre Demonization – Post Demonization	-12993.250	19578.195	4894.549	-23425.734	-2560.766	-2.655	15	0.018

The preceding table's Paired sample test mean value of - 12993.250 indicate that there is a typical difference between Interest paid before and after Demonetization. The p-value gained from the table is 0.018 which is lower than the significant value of 0.05, ($\alpha=0.05>p=0.018$) reject the H0, which demonstrates there is a statistically significant difference between the Net pay of Pre-Demonetization and Post-Demonetization.

Paired Sample T Test
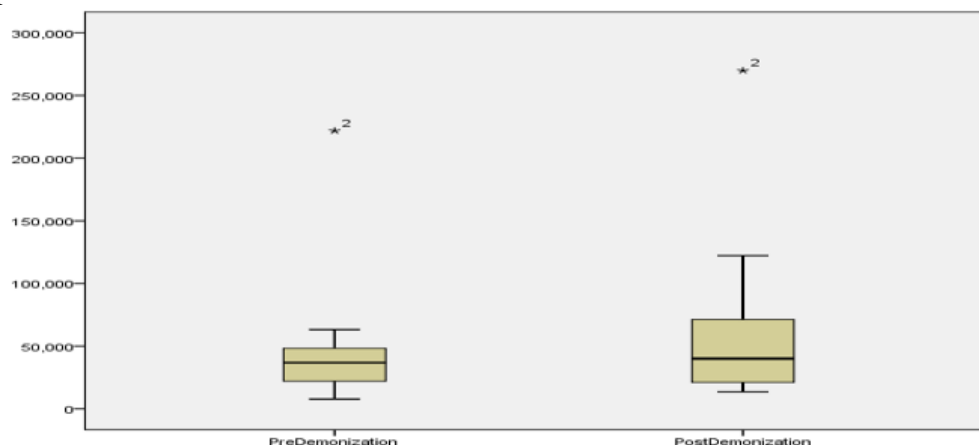
The interest payments made after demonetization are dramatically higher than those made before. This also implies that pre- and post-Demonetization interest payments are separate.

ANALYSIS OF CORRELATION

Null Hypothesis (H0): There is no correlation between interest earnings and artificial intelligence rating.

Alternative Hypothesis (H1): Interest earnings and the A.I. Score are statistically related.

Correlation analysis between AI and Interest Income of the selected banks

Correlations

|		AI Score	Interest Income
AI Score	Pearson Correlation	1	0.630**
	Sig. (2-tailed)		0.009
	N	16	16
Interest Income	Pearson Correlation	0.630**	1
	Sig. (2-tailed)	0.009	
	N	16	16

**. Correlation is significant at the 0.01 level (2-tailed).
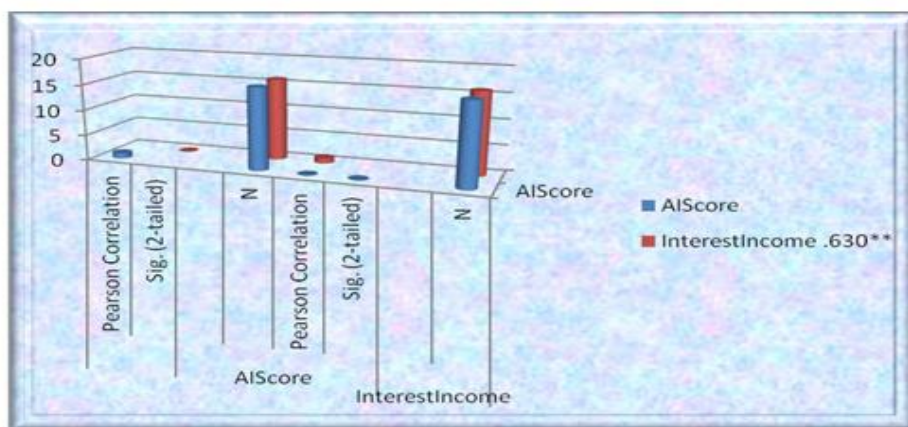
From the above table, the Pearson correlation value 'r' is viewed as 0.630 which connotes that there is a moderate relationship between µ1and µ2. The variables are viewed as emphatically connected (0.630), which implies that increment in one variable (µ1) will in general expansion in another variable (µ2).

The p-value got from the table is 0.009 which is lower than the significant value of 0.05, (α=0.05> p=0.009) rejects the Ho, which demonstrates there is a statistically significant correlation between µ1and µ2.

Scatter plot of Artificial Intelligent Score and Interest Income:
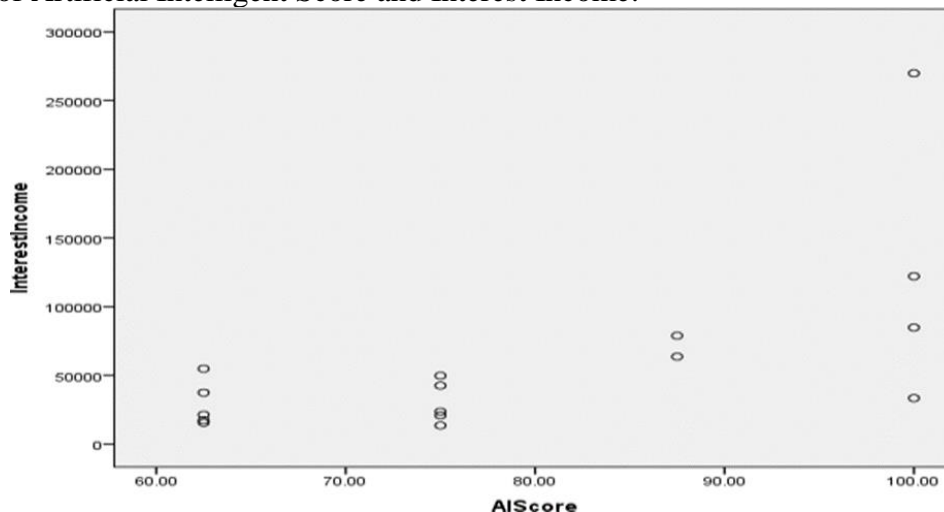
The above Scatter plot shows that AI scores under 80 will gives interest pay of under 55000 crores andthe AI score over 80 will gives the net interest pay in excess of 55000 crores. It uncovers that use of Artificial Intelligence in their business activity and Interest pay has high connection between them.
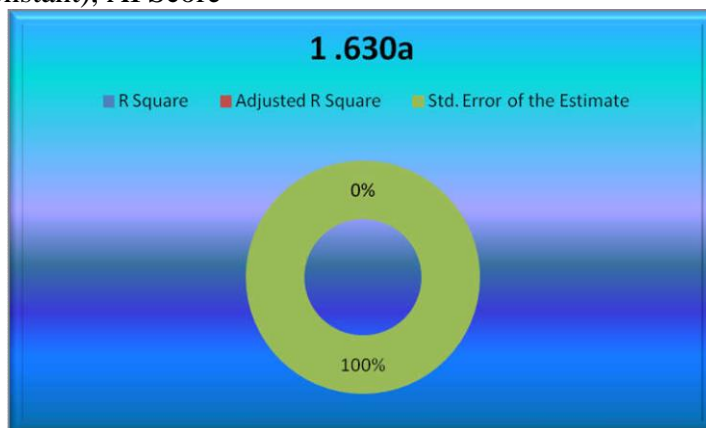
SIMPLE LINEAR REGRESSION ANALYSIS

Model Summary Simple Linear Regression analysis

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.630[a]	0.397	0.354	51172.212

a.   Predictors: (Constant), AI Score

b.   Dependent Variable: Interest Income

From the above table R-Value is viewed as 0.630, which indicates high degree of relationship between µ1and µ2. Also, the R2 Value (0.397= 39.7%) shows that, the complete extent of change in the reliant variable (µ2) by the autonomous variable (µ1) is 39.7% which is medium.

ANOVA

ANOVA result of Artificial Intelligence Usage Score and Interest income of the selected banks:

ANOVAa

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24150200032.522	1	24150200032.522	9.223	0.009[b]
	Residual	36660334454.915	14	2618595318.208		
	Total	**60810534487.438**	**15**			

a.   Dependent Variable: Interest Income
b.   Predictors: (Constant), Artificial Intelligence Score
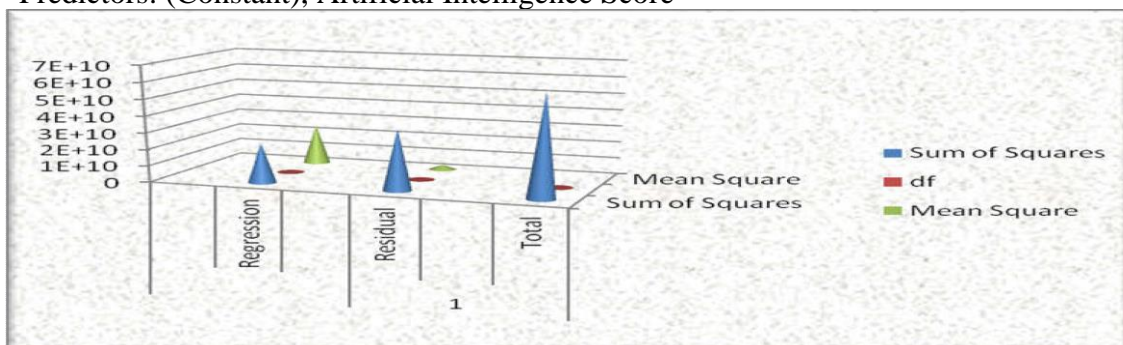
The T-test analysis of the coefficient for the Artificial Intelligence Usage Score and Interest Income of the selected banks indicates the following: The coefficient result for the Artificial Intelligence Usage Score is 2685.117. This means that a one-unit increase in the Artificial Intelligence Usage Score leads to an estimated increase of 2686.982 in the Interest Income of the selected banks. In simpler terms, the coefficient suggests that there is a positive relationship between the usage of Artificial Intelligence and the Interest Income of the selected banks.

As the Artificial Intelligence Usage Score increases, the Interest Income is expected to increase as well. However, it's important to note that this interpretation is based solely on the coefficient and further analysis is needed to establish a causal relationship and consider other factors that may influence the Interest Income of the banks.

Coefficientsa

| Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-152481.860	70929.981		-2.150	0.050
1			0.630		
AI Score	2685.117	884.173		3.037	0.009"

a. Dependent Variable: Interest Income

Interpretation:
Based on the provided information, the T-test yielded a significant value of 0.009, which is lower than the significance level of 0.05 ($\alpha=0.05> p=0.025$). This indicates that the proposed regression model has a statistically significant predictive ability for the outcome variable. The B coefficient is calculated to be 2685.117, suggesting that a 1-unit increase in $\mu 1$ results in a 2686.982 increase in $\mu 2$.

Regression Model
Interest Income = -152481.860+ 2686.982
$\mu 1 + \epsilon$ Simple Linear Regression
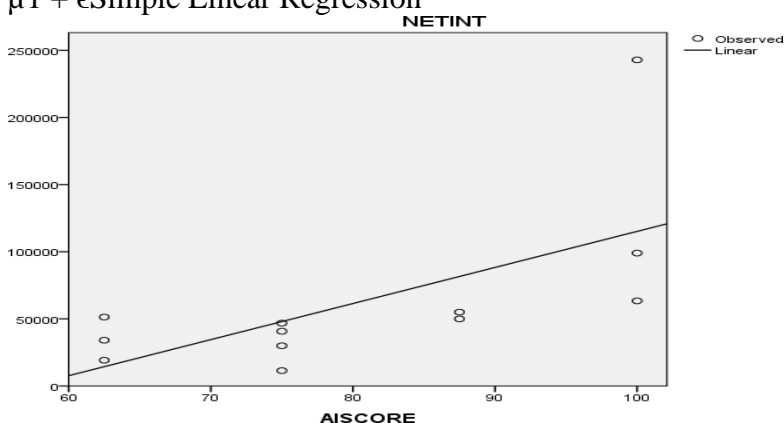
Conclusion & Implication Results
There may be numerous ways in which artificial intelligence helps the financial sector. It's revolutionizing the way banks and other financial services communicate with customers in India. It is also used to verify an individual's identity and income. The application of AI has the potential to streamline business operations, provide customized services, and propel broader initiatives like financial inclusion. Traditional financial institutions are increasingly using cutting-edge technologies like blockchain, cloud computing, and artificial intelligence (AI) to improve operational efficiencies and reduce costs. With the development of AI, it will be possible to do more with less resources. There's little doubt that the relentless march toward digitization is upending traditional monetary systems.

Improved Customer Experience: AI enables banks to offer personalized and proactive services to customers. Chatbots and virtual assistants powered by AI can provide instant and accurate responses to customer queries, offer tailored product recommendations, and deliver personalized financial advice.

Fraud Detection and Prevention: AI can analyze vast amounts of data in real-time to detect patterns and anomalies that may indicate fraudulent activities. Machine learning algorithms can continuously learn from new data and adapt to evolving fraud patterns, strengthening a bank's ability to prevent financial crimes.

Risk Management: AI-powered systems can analyze complex data sets, including market trends, customer behavior, and credit risk, to provide more accurate risk assessments. This helps banks in making informed decisions about lending, investment, and portfolio management, reducing potential risks.

Future Scope:

Compliance and Regulatory Support: Banks face stringent regulations and compliance requirements. AI can assist in automating compliance processes, ensuring adherence to regulations, and reducing the risk of non-compliance. Natural language processing capabilities can help analyze legal documents and extract relevant information for compliance purposes.

Data-driven Insights: AI algorithms can analyze vast amounts of data to generate actionable insights for banks. These insights can be used for predictive analytics, identifying market trends, customer segmentation, and optimizing business strategies.

Cost Reduction: By automating routine tasks and improving operational efficiency, AI can help banks reduce costs associated with manual labor and error correction. Additionally, AI can assist in identifying cost-saving opportunities and optimizing resource allocation.

Innovation and Product Development: AI enables banks to develop innovative financial products and services. For example, AI-powered robo-advisors can provide automated investment advice, and AI-driven credit scoring models can enhance the accuracy and speed of loan approvals.

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