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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON MARKETING PERFORMANCE IN INDUSTRIAL COMPANIES

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Abstract
This study aims to explore the impact of artificial intelligence on marketing performance in Iraq. Industrial facilities in Iraq were chosen as the research field, while the community consisted of employees in these facilities, estimated at 2000 employees. A sample of 500 workers was drawn. The researcher adopted a descriptive-analytical approach in this study as it suits the research topic. The researcher also designed a questionnaire as a research tool. The research concluded a number of important findings, including:
- The existence of a significant effect between the dimensions of artificial intelligence and marketing performance.
The researcher recommended the necessity of enhancing the reliance on smart technology and AI in industrial companies to boost marketing performance.

Keywords: Artificial intelligence, smart technology, marketing performance, industrial companies.

Introduction

Marketing performance plays a critical role in driving growth and success for industrial companies operating in today's dynamic market environments, and with increasing competition, evolving consumer preferences, and rapid technological advancement, improving marketing performance has become more difficult than ever.

With the tremendous development of technology and the resulting birth of artificial intelligence (AI), in particular, which has presented new and exciting possibilities to increase the efficiency and effectiveness of marketing. AI algorithms can handle a huge amount of information and analyze it in the fastest and most accurate ways. This enables organizations to reduce effort, automate routine tasks, personalize customer experiences, and predict future trends.

This study aims to know the impact of artificial intelligence on marketing performance in Iraqi industrial companies. It highlights the importance of marketing performance as a strategic driver of competitiveness and profitability. The paper also explores the current state of marketing performance in Iraqi industries and identifies challenges that hinder achieving optimal results. Moreover, it highlights the transformative power of AI in revolutionizing marketing functions and provides valuable insights into leveraging this technology to improve marketing performance. Ultimately, this research seeks to contribute to the growing body of knowledge surrounding AI applications in marketing while providing practical guidance for industrial organizations seeking to gain competitive advantages through cutting-edge technologies.

First: Research Methodology

1) Research problem:

The industry suffers from difficulties resulting from modern business management, especially related to competition, changing needs and desires of the establishment's customers, and the struggle to survive and continue in the markets, which has become a matter that requires the importance of reviewing and evaluating the marketing performance of those companies in order to treat emerging problems, and strive to achieve marketing performance. Professional and exceptional, as competition between organizations in light of marketing performance management has become greater than any other department inside or outside the organization.

Accordingly, after reviewing and investigating, the researcher found a necessary need to prepare a study examining the impact of AI on the marketing performance of organizations, as the researcher's recommendation (Al-Ajili, 2018) was benefited from, which is (working to pay great attention to improving the marketing performance of companies), and this leads us To the idea that when marketing performance is improved, the facility is able to achieve better competition, which is evidence of the health and well-being of this facility. Based on the above, Al-Baha defines the problem of the study through this inquiry: Is there no significant effect of artificial intelligence on the marketing performance of industrial companies?

2) The importance of research:

- Addressing the knowledge gap: Despite the widespread adoption of artificial intelligence in Western countries, there are limited studies examining its effects on marketing performance specifically in developing markets such as Iraq. This research attempts to fill this gap.
- Leading the competition: Companies must exploit every opportunity to stay ahead. Understanding the impact of AI on marketing performance allows manufacturers to harness its potential to drive innovation, reduce costs, increase productivity, and create personalized customer experiences.
- Enhancing customer satisfaction: Exploiting AI technologies enables companies to deliver superior customer experiences through targeted promotions, real-time

interactions, and personalized offers. A deeper understanding of the effects of AI on marketing performance helps achieve increased loyalty, satisfaction, and long-term relationships.

- Guide policy development: The results of this study may help policymakers guide and regulate the responsible use of AI, protect consumers, foster innovation, and create an ecosystem conducive to digital transformation. Moreover, it encourages further exploration of AI's untapped potential in the marketing field and beyond.

3) Research objectives:

- Study the impact of AI on the marketing sector in the industry.
- Discovering the impact of applying AI in the field of marketing on achieving the goals of industrial companies.
- Providing proposals to enhance marketing performance in the industry based on AI.
- Determine the impact of AI on the efficiency of market targeting in the industry sector.
- Evaluate the impact of AI on improving product innovation.
- Analyze the impact of AI on improving the effectiveness and efficiency of customer and sales management systems.

4) Research structure:

Through the targeted problem, we have two main variables:

- Fixed variable (X) artificial intelligence
- Dependent variable (Y): marketing performance.

Here is an illustration:

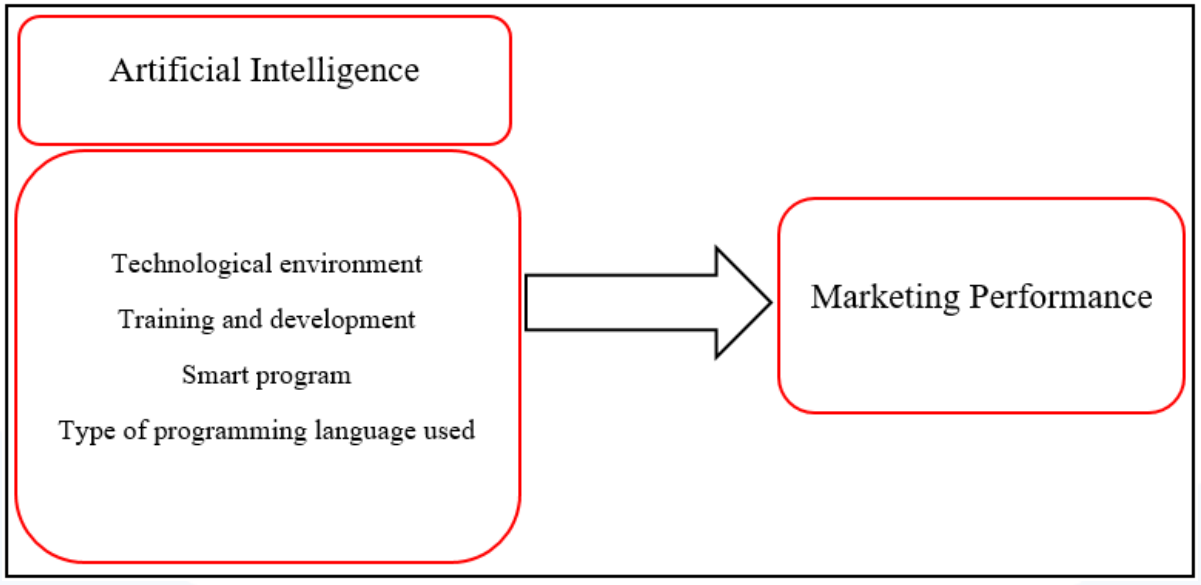


Figure No. (1): Study model

5) Research hypotheses:

The main hypothesis of the research: There is no significant effect at the level of significance ($\alpha \leq 0.05$) of artificial intelligence on marketing performance. And it emerges from it:

• The first sub-hypothesis: The technological environment does not significantly affect marketing performance.
• The second sub-hypothesis: Training and development does not significantly affect marketing performance
• The third sub-hypothesis: The smart program does not significantly affect marketing performance.
• The fourth sub-hypothesis: The type of programming language used does not significantly affect marketing performance.

6) Research methodology:
The researcher resorted to relying on the descriptive analytical method by reviewing the literature, deriving hypotheses, collecting field data and analyzing it, in order to finally test the study's hypotheses and interpret its results.

7) Research limitations:
- Spatial boundaries: establishments in the industrial sector.
- Time limits: The study was conducted in the 2022/2023 academic year.

8) Research tool: The questionnaire is the study tool as it is suitable for measuring the study variables.

Second: A theoretical framework
1. The concept of artificial intelligence:
Artificial intelligence refers to imitating human intelligence in machines programmed to think and learn. These smart objects mimic cognitive functions associated with problem solving, reasoning, perception, natural language processing, pattern recognition, planning, learning, and decision making. AI includes a range of fields such as machine learning, neural networks, robotics, computer vision, expert systems, speech recognition, and natural language processing (Mathies, Hinz, 2018, p2).
The goal of AI is not just to replicate human capabilities, but to exceed them, enabling computers to interpret sensory input, understand spoken or written languages, recognize patterns, make predictions, and make independent decisions under uncertain conditions. Over time, AI has gradually evolved due to advances in computing hardware, algorithm design, data availability, and storage capacity. Today, AI powers many of the modern technologies we rely on daily, including virtual assistants, recommendation engines, chatbots, self-driving cars, medical diagnostic software, and others (Courville, 2016, p3).
At its core, AI represents a paradigm shift in automation and computational thinking, allowing machines to augment human capabilities, solve complex problems efficiently, and unlock unprecedented levels of creativity, innovation, and discovery. However, ethical considerations arise with its enormous potential, necessitating careful supervision to prevent unintended consequences, maintain fairness, promote transparency, and protect privacy rights (Al-Salman, 2022, p. 49).

AI has been defined as a branch of computer science that aims to develop systems and programs capable of analyzing data and arriving at an appropriate decision independently, similar to humans (Al-Bazzaz, 2017, p. 547). Artificial Intelligence: refers to problems that cannot be solved by relying on computers (Nam, 2021, p499).

- It is a science that relies on algorithms, mathematical models, and programming techniques to enable devices to simulate human behavior and make decisions that favor the best (Ronanki, 2018, p54).
- As Al-Daoud defined it in 2021 as "computer technologies and systems that aim to give machines the ability to interact similar to humans using complex algorithms, machine learning, neural networks, and huge data analysis to enable machines to learn from previous experiences. AI includes applications in various fields such as visual and audio technologies, machine translation, And robots with self-thinking capabilities. It aims to develop systems with intelligent capabilities that surpass humans in performing complex tasks, improving processes, and solving problems with high efficiency: (Al-Daoud, 2021, p. 56)

AI tasks include learning, thinking, problem solving, perception, decision making, and adaptation. Relying on multiple specializations. (Al-Musallam, 2020, p. 69), ML constitutes one of the branches of AI with a focus on automated model building through data input rather than explicit programming instructions. Machine learning systems learn patterns, rules, representations, and abstractions inherent in training data sets, improve subsequent behavior accordingly, and incrementally adapt to changing environments via feedback loops (Abu Zaid, 2019, p. 94).

Deep learning (DL) refers to another branch of machine learning, characterized by hierarchical and multi-layer neural network architectures designed to mimic biological brains. DL models automatically extract high-level features from raw data streams without the need for extensive manual feature engineering, thus facilitating robust and scalable performance across diverse domains (Haenlein, Kaplan, 2019p14). As for the categories of AI, there is a common classification that distinguishes between four main branches along with subcategories:

A. Traditional artificial intelligence: This includes (Li, Adaval, 2010.p860)

- Rule-based systems: apply symbolic logic to reason and draw conclusions based on factual premises such as MYCIN, PROLOG.
- Search algorithms: systematically navigate large solution spaces, finding near-optimal paths e.g. Minimax and Alpha-Beta Pruning.
- Optimization methods: choosing the best possible trade-offs subject to constraints e.g. Linear programming, annealing, simulation.
- Logical operators: represent knowledge using formal logic, e.g. Realistic mechanisms and subjective cognitive logic.
- Planning and scheduling: creating sequences of actions to accomplish required situations e.g. STRIPS, Graphplan.

B. Machine Learning ML:

- Supervised learning: mapping labeled inputs onto corresponding outputs, for example, regression, support vector machines, and random forests.
- Unsupervised learning: identifying latent structures hidden in data e.g. Clustering, dimensionality reduction, and one-class classification.
- Reinforcement Learning: Interactively train agents to receive rewards or punishments, e.g., Q-Learning and Monte Carlo Tree Search.

C. Natural Language Processing (NLP):

- Syntax: analysis of grammatical structures such as part-of-speech marking, and dependency analysis.
- Morphology: Separating words into meaningful units such as stem, Lemmatization.
- Semantics: Interpreting the meanings conveyed in sentences, e.g. Accuracy of primary reference.
- Discourse: Capturing cohesive relationships that include speech, such as cohesion and cohesion.
- Production: Producing grammatically correct and linguistically sound texts, such as text summaries and dialogue systems.

D. Computer Vision (CV):

- Object recognition: detecting instances of predefined classes (directed gradient graphs, deformable part models)
- Scene visualization: description of entire scenes (ImageNet Challenge, Places Database)
- Optical flow: tracking motion vectors across video frames, e.g., Horn-Schunck, Lucas-Kanade.
- Action recognition: describing human movements (human activity datasets, THUMOS challenges.)
- Robotics: Enabling automated platforms to navigate physical worlds intelligently, e.g., SLAM, Grasp Planning. (Kumar, Sharma,2021, p1060).

2. The concept of marketing performance:

Marketing performance refers to measurable results resulting from marketing initiatives and investments made by organizations to attract, engage, convert, retain and grow customers. Effective marketing performance entails delivering compelling value propositions that align with the target audience's needs, preferences, behaviors and expectations. Monitoring marketing performance metrics highlights return on investment (ROI), identifies successful tactics, uncovers missed opportunities, and guides iterative improvement cycles.

Key components of marketing performance include:

- Market share: measuring relative sales volume compared to competitors occupying similar niches.

- Customer Acquisition Cost (CAC): Calculating expenses requires acquiring individual customers, calculating lifetime values, and deriving net profits.

- LVR: Compare lead generation volumes sequentially to forecast impending revenue expansion.
- Return on Advertising Spend: ROAS Determine advertising return on investment by dividing attributable revenues by spending expenses.
- Net Promoter Score (NPS) surveys the likelihood of recommending a client's services, and measures the effectiveness of organic advocacy.
- Content engagement metrics: Determine website traffic, click-through rates, conversion frequencies, bounce rates, dwell times, scroll depth, shares, likes, comments, etc.
- Channel Attribution Modeling: Allocate credit for conversions proportionally distributed across touchpoints that comprise multi-channel journeys.
- Testing and experimental frameworks: systematically comparing alternative hypotheses statistically, for example, AB testing, multivariate regression, and propensity score matching (Lux, colleagues. 2019, p55).

Performance is defined as measuring the achievement of the required results in any field or activity. Performance is evaluated by measuring a set of indicators and standards, and comparing them to specified and expected standards. Performance may be measured in units of time (monthly, annually) or in units of quantity (revenue, sales, production level) and may be done individually for individuals, for groups or for entire organizations.

- While marketing: is directing activities related to analyzing the market, identifying the needs and desires of the targets, describing suitable products or services to meet them, convincing customers to buy these products or services, determining their prices, distributing them, and promoting them in effective ways. (Wang, Luo, Yang, 2021, p46)

The marketing process includes several activities, including: analyzing the market, studying customers and their needs, developing and designing products and services, determining marketing strategies and plans, determining the appropriate price, and selecting, implementing and designing branding and promotion strategies.

While marketing performance is defined as the ability to achieve goals and achieve desired results, which includes increasing sales and contributing to increasing profits. Marketing performance can be measured by several indicators and variables such as sales volume, market growth, increased market share, customer satisfaction, and others.

Marketing performance management is considered an essential part of the marketing process, as current marketing performance is analyzed and evaluated and strategies and plans are developed to achieve marketing goals (Verhoef, Lemon., Parasuraman, 2021, p22). Through these concepts, it is noted that marketing performance can be represented in three stages as follows:

Figure No. (2) Stages of marketing performance

(Agnieszka Trojanowska & Zdzisław Polkowski). (2017). Application of the Marketing Plan in Reality – Stages of Implementation and Challenges on the Example of a Small Enterprise. Entrepreneurial Business and Economics Review, 5(2), 181-196

From the above, we conclude that marketing performance focuses on the marketing function to achieve marketing goals.

Third: A practical framework

Practical procedures were prepared by taking the following steps: - Determining the method - The study population - Drawing the research sample, which amounted to 500 workers - Determining the statistical methods used. - Designing the research tool, which included 31 questions, 5 personal information questions, 16 (AI) questions, and 10 (marketing performance) questions - Testing the study tool, where it was found that there is a significant relationship between the statements and the corresponding results, which indicates the validity of the internal consistency - Testing the reliability of the tool through the Cronbach's alpha test. It was found that the study measures are stable.

- Hypothesis testing:

The first sub-hypothesis: The technological environment does not significantly affect marketing performance.

Table (4-19): Extracts of the impact of the technological environment on marketing performance

Levels			**Model indicators**			Marketing performance
Sig.	t	B	Adjusted R Square	R Square	R	
0.00	20.803	1.440	.128	.130	.360	(Constant)
0.00	8.617	.298				Technological environment

Source: Prepared by the researcher

These outputs have been reached:

- R value = 0.36: indicates the correlation between the technological environment and marketing performance, i.e. there is an acceptable correlation.
- R Square value = 13: indicates that the technological environment explains about 13% of the variation in marketing performance.

1) Adjusted R Square= 0.12 It is used to compensate for the number of variables in the model. In this case, this value is very close to R Square, indicating that the model has not added significantly other variables.

2) The value of B: for the technological environment is 0.298, and this indicates the existence of a relationship.

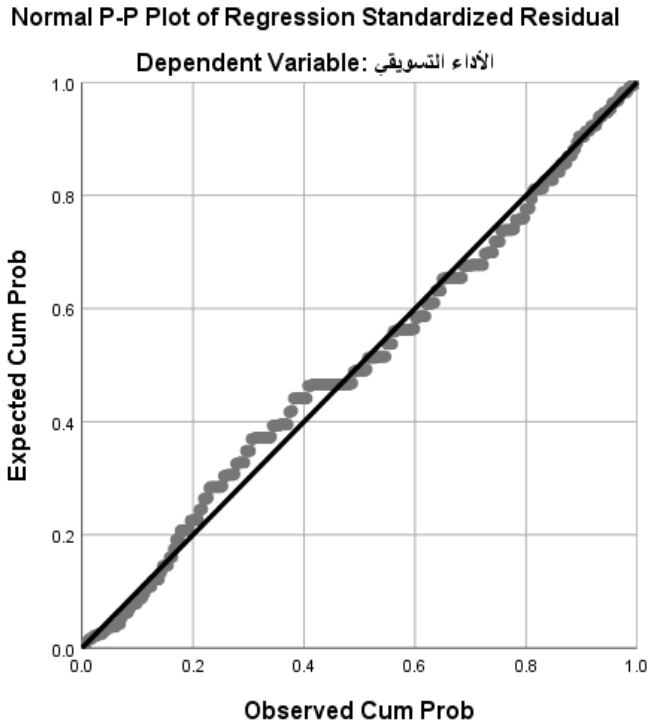
3) T value: 8.617. This indicates the presence of an effect.

This results in our equation:

$$y = 1.440 + 0.298x + \varepsilon$$

Thus, the technological environment provides a degree that improves 0.298 in marketing performance. This is a form of the distribution of the remainders.

Figure (4-13): Normal distribution for the rest of the model.



Source: Prepared by the researcher

It is shown that the residuals propagate normally and thus inference can be made using the estimated model.

- **The second sub-hypothesis**: Training and development does not significantly affect marketing performance in industrial companies.

Table (4-20): Extracts from testing the impact of training and development on marketing performance

Levels			**Model indicators**			Marketing performance
Sig.	t	B	Adjusted R Square	R Square	R	
0.00	18.386	1.327	.161	.163	.404	(Constant)
0.00	9.849	.358				training and development

Source: Prepared by the researcher

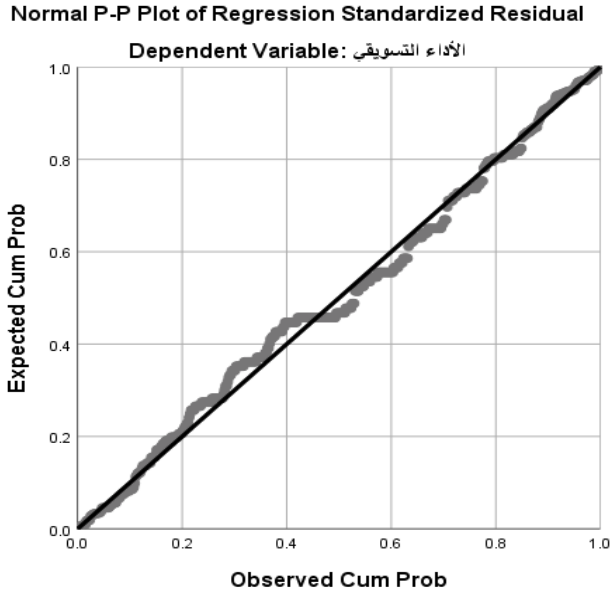
Based on the given table the results show:

- Determining data: The statistical model used in this study is classified as moderate, as the R Square rating index gives a value of 0.163, which represents the percentage of variation in marketing performance that can be explained by AI, and this percentage is modified in the Adjusted R Square rating indicator.
- Influencing factors: It appears that training and development have a clear and important relationship with marketing performance, as the linear correlation index between them (B) gives a value of 0.358. It expresses the increase in the percentage of change in marketing performance with the increase in training and development factors, and the t factor indicates the extent to which the results are significant.
- Statistical significance: The independent variable has thanks to the science of statistics, and a value of zero means that there is no statistical significance, and the last result of zero in this table shows that there is statistical significance at least at a significance level of 0.01. We conclude this equation:

$$y = 1.327 + 0.358x + \varepsilon$$

This is what the residuals are distributed like

Figure (4-14): Normal distribution for the rest of the model.



Source: Prepared by the researcher

It is shown that the residuals propagate normally and thus inference can be made using the estimated model.

- The third hypothesis: There is no significant effect at the significance level (0.05) of the smart program on the marketing performance in companies.

Table (4-21): Extracts from testing the impact of the smart program on marketing performance

Levels			**Model indicators**			Marketing performance
Sig.	t	B	Adjusted R Square	R Square	R	
0.00	17.157	1.324	.144	.146	.382	(Constant)
0.00	9.227	.345				Smart program

Source: Prepared by the researcher

Based on the given table the results show:

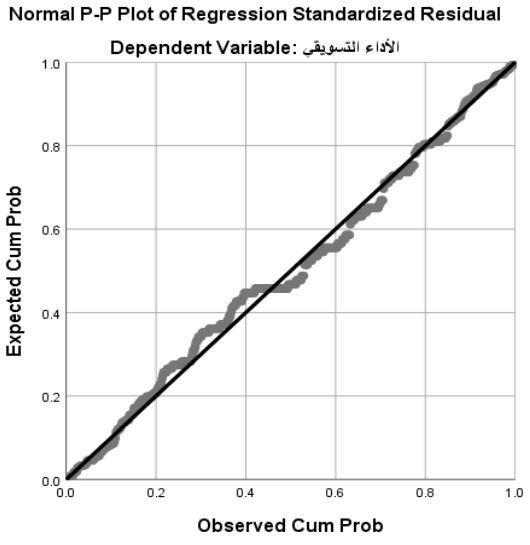
- R: Shows the impact of the smart program on marketing performance.
- R Square: shows that 14.6% of the variance in marketing performance is explained by intelligent software.
- Adjusted R Square: shows that 14.4% of the variance in marketing performance is explained by the intelligent program after adjusting the factors.
- The value of B shows that a unit increase in the level of the smart program is accompanied by a 0.345 unit increase in marketing performance.
- The t value indicates that the relationship between the smart program and marketing performance is highly statistically significant.
- Sig value. Very small (zero) confirms the relationship between intelligent software and marketing performance.

We conclude this equation:

$$y = 1.324 + 0.345x + \varepsilon$$

This is the shape of the trumpet distribution

Figure (4-15): Normal distribution for the rest of the model



Source: Prepared by the researcher

It is shown that the residuals propagate normally and thus inference can be made using the estimated model

- The fourth sub-hypothesis: There is no significant effect at a significance level of 5% for the type of programming language used on marketing performance.

Table (4-22): Extracts from testing the impact of the programming language used on marketing performance

Levels			**Model indicators**			Marketing performance
Sig.	t	B	Adjusted R Square	R Square	R	
0.00	17.623	1.226	.215	.216	.465	(Constant)
0.00	11.722	.380				The programming language used

Source: Prepared by the researcher

We conclude the following:
From the given table, the relationship between the programming language used and marketing performance is illustrated as follows:

1. Model indicators:
- R: The correlation value of the relationship between the programming language used and marketing performance is 0.465.
- R Square: Set the relationship between the programming language used and marketing performance is 0.216, which means that 21.6% of the change in marketing performance is explained by the programming language used.
- Adjusted R Square: 0.215.

2. Regression analysis:
- The value of the constant in the model is 1.226.
- The programming language used: The programming language used significantly affects marketing performance, with a value of B of 0.380. This indicates that using a specific programming language improves marketing performance.
The value of the reasonable t test is 11.722.
-Sig value. It is 0.00, which means that there is a positive significant effect of the programming language used on marketing performance.
In general, it can be said that the programming language used has a significant and positive impact on marketing performance.
This is the effect equation:

$$y = 1.226 + 0.380x + \varepsilon$$

This is what the residuals are distributed like

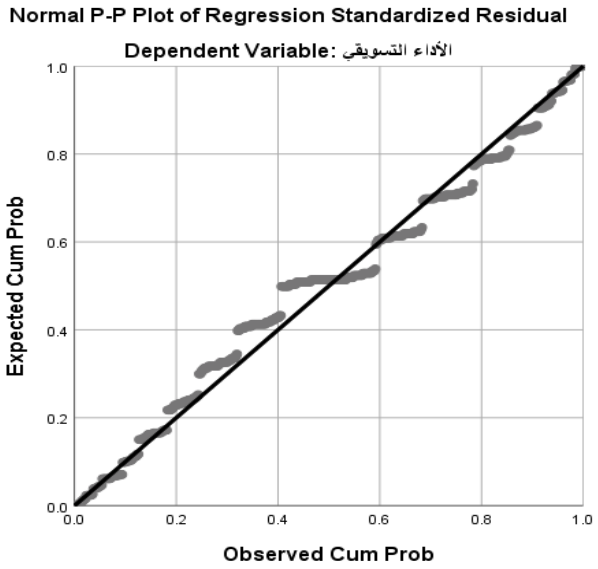


Figure (4-16): Normal distribution for the rest of the model.

Source: Prepared by the researcher
It is shown that the residuals propagate normally and thus inference can be made using the estimated model.

Fourth: Conclusions and recommendations

Conclusions

1. Improving marketing performance: It has been shown that there is an acceptable effect of AI on marketing performance based on huge data and the application of machine learning models and techniques. When an AI system is trained on historical marketing performance data, it may be able to infer previous patterns and relationships that were not obvious or difficult to analyze by humans. Thus, it can achieve greater accuracy and improve marketing performance.
2. Save time and effort: Instead of relying on manual data analysis, AI performs operations faster.
3. Improve decision making: AI makes suggestions based on data analysis and probabilistic models. This can help decision makers.
4. Reducing human error: AI contributes to reducing human error during marketing performance. By relying on powerful artificial intelligence systems, emotions influencing decisions are eliminated.

Recommendations

1. Motivating establishments to use AI in their marketing operations, which supports their competitive position.

2. Developing technological systems in facilities to be able to deal with big data and apply machine learning techniques. Graphic analysis must be provided within the organization to ensure full use of artificial intelligence in marketing performance.
3. Providing appropriate training and qualification for workers in the Iraqi industry on the concept of AI and how to use it in marketing performance. Workshops and programs can be provided to enhance the necessary skills.
4. Supporting research and innovation in the field of AI in the Iraqi industry, by allocating financial and human resources to explore and develop new applications of AI in the field of marketing.
5. Stimulating cooperation with international companies and institutions with expertise in the field of AI, by establishing partnerships and exchanging knowledge and technologies to benefit from their expertise and apply them in the Iraqi environment.
6. Continue to research and follow developments in AI and analyze their impact on marketing performance, and update marketing foundations based on this. This requires following up and studying recent scientific literature and relevant workshops.

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