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# Impact of Artificial Intelligence (AI) on Organizational Performance of Table Water Manufacturing Firms in South-East Nigera.

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**ABSTRACT**

This study focuses on the impact of artificial intelligence (AI) on organizational performance of table water manufacturing firms in south- East Nigeria. The research adopts questionnaire method with a sample of 200 respondents; judgment sampling and simple random sampling Techniques were applied. The result shows that the impact of artificial intelligence (AI) affect standard of manufacturing firms negatively. The result also shows that 65.3% of the respondents do not believe that artificial intelligence (AI) techniques are effective in manufacturing firms in Nigeria. Using Chi-square test (p-value < 0.05), it shows that artificial intelligence (AI) in manufacturing of table water have a significant impact on south-east Nigeria.

Keywords: impact, artificial intelligence (AI), manufacturing firms, chi-Square, sampling Techniques, percentages, SPSS, judgment sampling, simple random sampling.

## 1.0 INTRODUCTION

The word Artificial intelligence (AI) refers to the study of creating machines that can quickly mimic human thought and behavior. They can use logic to solve a problem and come to a conclusion. In the manufacturing sector and other areas of human activity, artificial intelligence programs are quite important, particularly when it comes to the production of table water in southeast Nigeria. It frequently has a broad variety of applications and is highly specialized for a particular purpose. There are too many benefits of artificial intelligence in this century to list them all. According to Kenneth Laudon c, and Jane Laudon P.L (2007), explained in the rapidly evolving field of contemporary technology, artificial intelligence (AI) has become a transformative force that is transforming a number of industries. AI is essentially a derivation of since ancient times; people have been fascinated by the possibility of creating intelligent robots. After years of research employing AI programming systems, smart and intelligent machines are now a reality. Without a question, AI has saved time and made human tasks less stressful. Financial analysts, for example, are crucial to company and employ a range of AI systems to manage assets, invest in stock markets, and carry out other financial tasks. Artificial intelligence is used by government organizations to monitor, evaluate, and implement policies. AI is used in offices to track employee activity and maintain records. AI is used in hospitals in a variety of ways, particularly in staff scheduling, patient bed assignment, and illness diagnosis and treatment. AI is also used by financial firms to keep an eye on.

## 2.0 METHODOLOGY

This paper focuses on analyzing the impact of artificial intelligence (AI) on organizational performance of table water manufacturing firms in south-east Nigeria. The study adopts questionnaire method in collecting data on artificial intelligence (AI) on organizational performance of table water manufacturing firms in south-east Nigeria. The sample techniques apply focus judgment sampling and simple random sampling with a sample size of 200 respondents. The methods of data analysis will be on percentage and chi-square which is processed using the SPSS software.

**Chi- Square test for independence**

In tests for independence or contingency tests, we try to see whether or not two criteria of classifications are independent of each other. Contingency tables are tables with cells corresponding to cross- classifications of attributes or events. We also follow the usual procedure for tests of hypothesis; thus:

The two criteria of classifications are independent

They are not independent

The test statistic is

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{\left(o_{ij} - e_{ij}\right)^2}{e_i}$$

With degree of freedom

r = number of rows

c = number of columns

$o_{ij} =$ The observed frequency of the ij$^{th}$ cell

$e_{ij} =$ The expected frequency of the ij$^{th}$ cell

And $e_{ij} = \frac{R_i \times C_j}{N}$

Where $R_i =$ row total of the ith row

And $C_j =$ column total of the jth column

N = Grand total

## 3.0 RESULT AND DISCUSSION

**TABLE 3.1: BIODATA**

| VARIABLES | FREQUENCY | PERCENTAGE |
|---|---|---|
| Gender | | |
| Male | 132 | 66.0 |
| Female | 68 | 34.0 |
| AGE | | |
| 15 - 20 | 34 | 12.5 |
| 21 – 25 | 25 | 17.0 |
| 26 – 30 | 50 | 22.5 |
| 31 – 35 | 46 | 23.0 |
| 36 – 40 | 45 | 25.0 |
| Marital Status | | |
| Single | 117 | 58.5 |
| Married | 83 | 41.5 |
| Level of education | | |
| Secondary school | 76 | 38.0 |
| B.sc/Hnd/Dip/Nce | 85 | 42.5 |
| Master's Degree | 39 | 19.5 |

Table 3.1: The table above examines the bio-data of the respondents, which shows that 66.0% of the respondents were male while 34.0% were female. The age group indicates that most of the respondents are between the groups of 15 to 30 years. The table also shows that 58.5% of the respondents are

single while 41.5% are married. The educational attainment shows that most of the respondents (42.5%) have the following qualifications, B.SC, HND, DIP, and NCE, 38.0% of the respondents have SSCE; furthermore, 19.5 have master's Degree.

**TABLE 3.2: AI adoption and implementation**

| VARIABLES | FREQUENCY | PERCENTAGE |
|---|---|---|
| Does your organization use Artificial Intelligence | | |
| Yes | | |
| No | 157 | 38.0 |
| | 43 | 42.5 |
| If yes, which AI technologies are used? | | |
| Machine Learning | 60 | 22.7 |
| Natural Language processing | 40 | 32.0 |
| Predictive analytics | 40 | 36.0 |
| Robotics | 60 | 4.0 |

Table 3.2: The table above examines the adoption of AI and implementation, which shows that 42.5% of the respondents were not using AI, while 38.0 used AI. Some of the AI technologies used are Machine Learning (22.7%), Natural Language processing (32.0%), and Predictive analytics (36.0%).

**TABLE 3.3: IMPACT OF ORGANIZATIONAL PERFORMANCE**

| VARIABLES | FREQUENCY | PERCENTAGE |
|---|---|---|
| How has AI impacted your organizations productivity? | | |
| Significantly improved | | |
| Somewhere improved | 150 | 75.0 |
| Not impacted | 50 | 25.0 |
| Somewhat decreased | 0 | 0.00 |
| Significantly decreased | 0 | 0.00 |
| | 0 | 0.00 |
| Has AI improved decision –making processes in your organization? | | |
| | 80 | 1.0 |
| Strongly agree | 100 | 4.0 |
| Somewhat agree | 2 | 5.0 |
| Neutral | 10 | 40.0 |
| Somewhat disagree | 8 | 50.0 |
| Strongly disagree | | |
| How has AI affected customer satisfaction? | | |
| Significantly improved | 130 | 65.0 |
| Somewhat improved | 70 | 35.0 |
| No impact | 0 | 0.00 |
| Somewhat decreased | 0 | 0.00 |
| Significantly decreased | 0 | 0.00 |

| | | |
|---|---|---|
| Has AI reduced costs in your organization? | | |
| Yes | 150 | 75.0 |
| No | 50 | 25.0 |
| How has AI impacted employee skills requirements? | | |
| Significantly increased | | |
| Somewhat increased | 140 | 70.0 |
| No impact | 60 | 30.0 |
| Somewhat decreased | 0 | 0.00 |
| Significantly decreased | 19 | 47.5 |
| | 21 | 52.5 |

Table 3.3: The table above examines the impact of organization performance, which shows that 75.0% of the respondents agreed that AI has improved organization performance. The table also indicates the 4.0% respondents agreed that AI is used in decision – making processes, while 50.0% disagreed that AI was not used in decision making processes. The result also indicates that 65.0% agreed that AI has improved customer satisfaction. The result also shows that 75.0% agreed that AI has reduced cost in the organization, while 25.0% disagree that AI has not. The result also shows that 70.0% respondents agree that AI has impacted employee skill, while 0.00 disagree that AI has not impacted employee skill.

**TABLE 4.0: CHALLENGES AND BENEFITS**

| | | |
|---|---|---|
| What are the primary challenges faced during AI implementation? (select all that applied) | | |
| Data quality issues | | |
| Lack of expertise | | |
| Integration with existing systems | 51 | 25.5 |
| Cost | 80 | 40.0 |
| | 20 | 10.0 |
| | 49 | 24.5 |
| What benefits has your organization derived from AI implementation? | | |
| Improved efficiency | 100 | 50.0 |
| Enhanced decision making | 5 | 2.5 |
| Increased customer satisfaction | 45 | 22.5 |
| Cost reduction | 50 | 25.0 |

Table 4.0: The table above examines the challenges and benefits of AI, which shows that 40.0% respondents agree that lack of expertise is the major challenge faced during AI implementation, while 24.5% disagree that cost is the primary challenged faced during AI implementation. The result also shows that 50.0% respondents agree that improved efficiency is the benefit obtained from AI implementation, while 25.0% disagree that cost reduction is the benefit derived from AI implementation.

**TABLE 4.1: FUTURE PLANS AND EXPECTATIONS**

| | | |
|---|---|---|
| Does your organization plan to increase AI investment in the next 2 years? (select all that applied) | | |
| Yes | 180 | 90.0 |
| No | 20 | 10.0 |

| | | |
|---|---|---|
| What areas do you expect AI to impact most in the next 2 years? | | |
| production | 100 | 30.0 |
| marketing | 30 | 20.0 |
| sales | 40 | 50.0 |
| Customer service | 30 | 100.0 |

**Table 4.1:** The table above examines the future plans and expectations of AI, which shows that 90.0% respondents agree that AI existence will be more than this in next two years, while 10.0% respondents disagree that AI will not in next two years.

***3.1: Research Hypotheses test***

$H_0$: Artificial intelligence (AI) has no significant effect on table water manufacturing firms in south-east Nigeria.

$H_1$: inflation has a significant effect on table water manufacturing firms in south-east Nigeria

**Test statistic: (SPSS Software version 23)**

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 1.6560E3[a] | 8 | .000 |
| Likelihood Ratio | 1.398E3 | 8 | .000 |
| Linear-by-Linear Association | 187.628 | 1 | .000 |
| N of Valid Cases | 200 | | |

a. 0 cells (.0%) have expected count less than 6. The minimum expected count is 60.63.

Using chi-square test statistic, it shows that p-value < 0.05. Therefore, we reject the null hypothesis and conclude that artificial intelligence (AI) has a significant effect on table water manufacturing firms in south-east Nigeria.

## 4.0 Conclusion

This study focuses on the impact of artificial intelligence (AI) on organizational performance of table water manufacturing firms in south- East Nigeria. The research adopts questionnaire method with a sample of 200 respondents, judgment sampling and simple random sampling Techniques were applied .Using the percentage and Chi-Square analysis, the result shows that 38.0% of the respondents agrees that the impact of artificial intelligence (AI) affect standard of manufacturing firms negatively. Furthermore, 99.3% of the respondents think that impact of artificial intelligence (AI) rate is a major concern in south- east Nigeria. The result also shows that 65.3% of the respondents do not believe that artificial intelligence (AI) techniques are effective in manufacturing firms in Nigeria. Using Chi-square test, it shows that the p-value = 0.00 < 0.05, which indicates that artificial intelligence (AI) rate in manufacturing of table water have a significant impact on south-east Nigeria.

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**Questionnaire**

**Section A: Demographics**

1. What is your age?

_____

2. What is your gender?

Male/Female/Other

3. What is your highest level of education?

_____

4. What is your occupation?

_____

5. What is your monthly income?

_____

**Section B: AI adoption and implementation**

**1.** Does your organization use artificial intelligence?

2. If yes, which AI technologies are used?

**Section c: Impact of organization performance**

1. How has AI impacted your organizations productivity?
2. Has AI improved decision –making processes in your organization?
3. How has AI affected customer satisfaction?
4. Has AI reduced costs in your organization?
5. How has AI impacted employee skills requirements?

**Section D: Challenges and benefits**

**1.** What are the primary challenges faced during AI implementation?

2. What benefits has your organization derived from AI implementation?

**Section E: Future plans and expectations**

**1.** Does your organization plan to increase AI investment in the next 2 years?

**2.** What areas do you expect AI to impact most in the next 2 years?