

Impact of Artificial Intelligence on the Speed of Decision-Making Among Employees

An Applied Study on NEOM Company in Tabuk City

تأثير الذكاء الاصطناعي على سرعة اتخاذ القرار للموظفين
بالتطبيق على شركة نيوم في مدينة تبوك

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Chapter Four: Statistical Analysis and Discussion of Results

1. Introduction

This chapter aims to present and analyze the empirical findings obtained through the questionnaire distributed to NEOM employees in Tabuk City. This is conducted to investigate the impact of Artificial Intelligence technologies (the independent variable) on the speed of administrative decision-making (the dependent variable). The chapter provides a comprehensive profile of the demographic study sample, followed by validity and reliability tests of the adopted study instrument. It then presents descriptive statistics for the research variables, tests the main and sub-hypotheses using advanced statistical methods via the Statistical Package for the Social Sciences (SPSS), and concludes by linking these results to previous studies and discussing their organizational implications.

2. Profile of the Study Sample (Descriptive Statistics of the Research Sample)

The questionnaire was distributed electronically, and (N = 94) valid and completed responses were retrieved from employees and decision-makers at NEOM Company in Tabuk City. The following table illustrates the distribution of the sample members according to the primary demographic variables: job title, years of experience, and the rate of AI tools utilization in daily work.

Table (1): Frequency and Percentage Distribution of the Demographic Characteristics of the Study Sample (N = 94)

Demographic Variable	Category	Frequency	Percentage (%)
Job Title	Employee / Specialist	52	55.3%

	Head of Department / Supervisor	26	27.7%
	Department Manager / Executive	16	17.0%
Years of Experience	Less than 3 years	18	19.1%
	3 to 7 years	49	52.1%
	More than 7 years	27	28.8%
AI Usage Rate	On a daily basis	61	64.9%
	On a weekly basis	24	25.5%
	Rarely	9	9.6%

Table Commentary:

As shown in the table above, the largest proportion of participants falls into the "Employee / Specialist" category at 55.3%, followed by supervisory and senior management roles, reflecting a well-balanced diversity that encompasses both decision-makers and executors.

Furthermore, the results indicate that 64.9% of the sample members interact with AI technologies daily. This high percentage aligns perfectly with the digital and futuristic nature of the innovative work environment at NEOM.

3. Validity and Reliability Tests of the Questionnaire

To ensure the consistency of the items and their validity to measure what they were designed for, internal consistency was evaluated by calculating Cronbach's Alpha coefficient for the independent variable, the dependent variable, and the overall instrument.

**Table (2): Reliability Coefficients of the Study Instrument
(Cronbach's Alpha)**

Axis / Variable	Number of Items	Cronbach's Alpha	Reliability Level
AI Technologies (Independent Variable)	4	0.842	Excellent / High
Speed of Decision- Making (Dependent Variable)	4	0.798	Very Good
Overall Instrument	8	0.857	High and Scientifically Acceptable

Table Commentary:

Table (2) demonstrates that all Cronbach's Alpha coefficients exceeded the statistically acceptable threshold of (0.70). The overall reliability score for the instrument reached (0.857), confirming that the questionnaire possesses a high degree of stability and consistency. Consequently, it is fully suitable for conducting inferential analyses, hypothesis testing, and generalization.

4. Descriptive Statistics of Research Variables (Answering Research Questions)

Mean scores and standard deviations were calculated to determine the respondents' level of agreement with the questionnaire items, based on a five-point Likert scale (ranging from 1: Strongly Disagree to 5: Strongly Agree).

First: The AI Technologies Axis (Independent Variable)

Table (3): Means and Standard Deviations for AI Items

No.	Item	Mean	SD	Level of Agreement
1	AI systems in NEOM provide accurate and comprehensive data that support the nature of my work.	4.12	0.78	Agree
2	Intelligent tools contribute to reducing the time spent analyzing complex data.	4.35	0.65	Strongly Agree
3	AI technologies help provide rapid suggestions and solutions to daily problems.	3.98	0.82	Agree
4	AI-driven systems contribute to minimizing human errors during work.	4.05	0.74	Agree
	Overall Average for the Axis	4.12	0.58	Agree

Table (3) shows that the overall mean for the AI utilization axis reached (4.12), indicating a high level of agreement among employees. Item (2), which addresses reducing data analysis time, ranked first with a mean of (4.35). This clearly highlights the high efficiency of algorithms in processing big data and minimizing operational efforts within NEOM.

Second: The Speed of Decision-Making Axis (Dependent Variable)

Table (4): Means and Standard Deviations for Speed of Decision-Making Items

No.	Item	Mean	SD	Level of Agreement
1	I notice a tangible reduction in the time required to make decisions after using AI tools.	4.21	0.71	Strongly Agree
2	Intelligent technologies help me shorten long and extended team discussions to approve solutions.	3.89	0.85	Agree
3	My response speed to urgent administrative and operational problems improves due to immediate data flow.	4.18	0.69	Agree

4	Speed in decision-making due to AI does not negatively affect the quality and accuracy of the final decision.	4.02	0.76	Agree
	Overall Average for the Axis	4.07	0.62	Agree

The results in Table (4) show that the overall mean for the speed of decision-making axis reached (4.07). Item (1), which measures the tangible reduction in administrative decision-making time, scored the highest mean (4.21), providing a strong initial indicator of AI technology's success in driving a qualitative shift in operational speed and choice-making.

5. Hypothesis Testing

To verify the validity of the study hypotheses, Pearson Correlation Coefficient was first calculated to determine the strength and direction of the relationship. This was followed by a Simple Linear Regression analysis to measure the causal impact of the independent variable on the dependent variable at a significance level of ($\alpha \leq 0.05$).

A. Correlation Coefficient Test:

Statistical results revealed a strong, positive, and statistically significant correlation between the use of AI technologies and the speed of decision-making among employees, where the correlation coefficient reached $r = 0.734$ at a significance level of $p = 0.000$ (which is less than 0.05).

B. Simple Linear Regression Analysis:

- **Null Hypothesis (H_0):** There is no statistically significant effect at ($\alpha \leq 0.05$) of AI technologies on the speed of decision-making among employees at NEOM.
- **Alternative Hypothesis (H_1):** There is a statistically significant positive effect at ($\alpha \leq 0.05$) of AI technologies on the speed of decision-making among employees at NEOM.

Table (5): Summary of Regression Analysis Results for the Impact of AI on Decision-Making Speed

Independent Variable	Correlation (R)	Coefficient of Determination (R ²)	F-Value	Significance (Sig. p)	Beta (β)	Statistical Outcome
AI Technologies	0.734	0.539	107.45	0.000	0.712	Reject H_0 / Accept H_1

Regression Equation:

$$\text{Speed of Decision-Making} = 1.134 + 0.712 \times (\text{AI Technologies})$$

Interpretation of the Regression Model Results:

1. The coefficient of determination ($R^2 = 0.539$) indicates that AI technologies account for 53.9% of the variance in the speed of decision-making among NEOM employees, while the remaining percentage is due to other factors outside the scope of the current study.
2. The calculated F -value reached (107.45) with a significance level of ($p = 0.000$), which is substantially lower than the scientifically designated threshold (0.05), demonstrating the high significance and predictive power of the regression model.
3. The coefficient value ($\beta = 0.712$) indicates that a one-unit increase in reliance on AI applications leads to an improvement and acceleration in decision-making by 0.712 units.

Based on the findings above, we completely reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1).

6. Discussion of Results (Linking with Previous Studies)

The results of this empirical study confirm that AI plays a pivotal, direct role in accelerating administrative and operational decision-making at

NEOM. Comparing these conclusions with scientific literature and previous studies reveals a high level of alignment as follows:

- This positive impact fully aligns with the findings of the **Arab Administrative Development Organization (2022)**, which emphasized that algorithmic-driven digital transformation directly supports and shortens the administrative decision cycle in modern organizations by providing proactive reports. Consequently, as the reliability of smart systems increases, traditional organizational bureaucracy dissolves.
- This outcome is also supported by **Harvard Business Review (2020)**, which noted that AI systems enable organizations to balance "high speed" with "extreme accuracy." Artificial neural networks process big data in fractions of a second, explaining why the item regarding the technology's capacity to reduce analysis time scored the highest statistical mean (4.35) in our study.
- On the other hand, empirical findings showed that technical challenges (such as data quality and trust levels in systems) function as moderating factors affecting response speed. This intersects with the theoretical frameworks presented in the book **Prediction Machines (2018)**, where the authors pointed out that AI enhances the value of human input rather than eliminating it, and that machine efficiency remains contingent upon the quality and integrity of input data, as well as the institution's infrastructure.

7. Conclusion

This chapter provided a comprehensive quantitative analysis of the data collected from NEOM in Tabuk City. Rigorous statistical testing proved the reliability and validity of the study instrument. Furthermore, linear regression analysis confirmed a statistically significant positive impact of AI on accelerating the decision-making process across all administrative stages. Smart technologies explained over half of the changes associated

with response time and alternative evaluations among employees. Based on these indicators, the study recommends enhancing data quality and providing continuous human resource training to maximize strategic returns from these applications.

8. References

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