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The Effectiveness of Using Artificial Intelligence to Enhance Scientific Production Efficiency: A Descriptive and Analytical Study

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Abstract

This research aims to explore the effectiveness of using artificial intelligence in enhancing the efficiency of scientific production. It investigates the relationship between the use of artificial intelligence tools and the improvement of research outcomes, focusing on aspects such as quality, speed, and innovation. The study relies on a descriptive-analytical approach, using questionnaires distributed to a sample of researchers and postgraduate students from various academic institutions. The results showed a positive impact of AI tools in supporting the research process, particularly in tasks such as data analysis, reference management, and idea generation. The study recommends expanding the use of artificial intelligence in academic environments and providing training programs to develop researchers' skills in employing these tools effectively.

Keywords: Artificial Intelligence, Scientific Research, Academic Production, Research Efficiency, Technological Innovation.

Introduction

Scientific research represents one of the most prominent pillars of development and progress in various fields. In light of the continuous technological advancements witnessed by the world, the scientific community has begun exploring the potential of artificial intelligence (AI) and its applications to support and develop research processes. AI is no longer limited to industrial or service domains but has penetrated educational and academic sectors, especially in areas related to scientific production.

Recently, academic institutions have increasingly turned toward employing AI technologies to enhance research capabilities, facilitate access to knowledge sources, analyze data, and assist researchers in developing their ideas. This transformation comes in response to the growing demands of scientific production, the increasing pressure on researchers to publish, and the need to produce high-quality research efficiently and in shorter timeframes.

This study comes in response to this growing interest, as it seeks to shed light on the role of AI in improving scientific production and identify the actual effectiveness of using these tools in the academic field.

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Research Problem

The research problem lies in the following question:

To what extent is the use of artificial intelligence effective in enhancing the efficiency of scientific production among researchers and postgraduate students?

Research Objectives

This study aims to:

- 1. Identify the reality of using artificial intelligence in scientific research.
- 2. Explore the degree to which researchers and postgraduate students rely on AI tools.
- 3. Analyze the impact of AI use on the quality and efficiency of scientific production.
- 4. Provide recommendations to optimize the use of AI in academic research.

Research Significance

The importance of this research lies in:

- Keeping pace with modern technological developments and their impact on the academic environment.
- Contributing to the enhancement of research quality and efficiency through the integration of AI tools.
- Assisting academic institutions in developing strategies to adopt AI in research processes.

• Providing a reference for future studies interested in the intersection of technology and scientific research.

Literature Review

Artificial intelligence has witnessed remarkable advancements in supporting scientific research, with previous studies examining its influence from multiple angles. However, many of these studies did not sufficiently focus on the perspectives of specialists in information science—despite their direct relationship with such technologies. Reviewing these studies helps identify research gaps and underscores the need for a study that addresses AI effectiveness in scientific production from their point of view.

This research responds to the growing demand for understanding AI's role in enhancing scholarly publishing, especially in the Arab academic context. This distinguishes it from many prior studies that primarily focused on technical or pedagogical dimensions without addressing the actual impact on research productivity and quality.

For example, Abbas (2024) emphasized AI's impact on improving research quality and data analysis, while Latrash (2023) addressed the current use of AI tools. In contrast, the current study adopts a holistic perspective encompassing challenges, potential, and the impact of AI on faculty members in a specific academic department.

This study aligns with Olson (2024) and Phan (2024), which explored ethical and regulatory aspects of AI usage, yet it uniquely focuses on assessing scientific productivity, rather than just the technical process of publishing. As such, it fills a significant gap in Arabic literature and

560 The Effectiveness of Using Artificial Intelligence to Enhance aligns with Saudi Vision 2030's goals for digital transformation in scientific research.

Furthermore, Al-Qahtani's study (2024) on integrating AI tools in university education supports the importance of training and skill development—an aspect emphasized in this study by focusing on the training needs of faculty members.

The Effectiveness of AI in Enhancing Scientific Production and Its Future Prospects

AI technologies offer immense potential in scientific writing. They can rapidly and efficiently generate scientific content, support brainstorming, review literature, analyze data, produce drafts, and perform linguistic proofreading. They also serve as sources for academic references. The emergence of AI has fundamentally transformed numerous fields. In research, it now plays a central role in accelerating and enhancing research processes, offering innovative solutions and more accurate outcomes.

Despite its many advantages, AI raises ethical concerns that must be addressed by researchers and institutions—particularly regarding the application of these technologies in ways consistent with core human values such as fairness, transparency, and accountability. Given the high responsibility and ethical standards required in scientific research, it is essential that AI usage adheres to accuracy, integrity, and research ethics.

Key AI contributions to scientific research include:

• **Brainstorming:** Providing novel ideas during the early stages of research.

• Literature Review: Speeding up literature reviews through summarization of relevant studies.

• **Data Analysis:** Transforming data into structured tables and visualizations.

• **Content Generation:** Assisting in writing articles and scientific reports (subject to verification).

• **Proofreading:** Enhancing clarity and quality through language correction and rephrasing.

• **Evaluation:** Assessing academic papers for quality and decision-making regarding acceptance or rejection (Al-Mutrafi, 2024, pp. 117–134).

To ensure research reliability and uphold ethical standards, AI systems must be continuously monitored, tested, and updated. Researchers must be trained to use AI in ways that complement their intellectual and analytical roles (Lotfi et al., 2025, pp. 9–11).

Future Prospects of AI in Academic Publishing

AI is transforming academic publishing by improving efficiency, reducing review time, and enhancing the precision of scientific analysis. Future directions for integrating AI include (Smith, 2023, pp. 45–60):

1. **Peer Review Enhancement:** Automating initial manuscript review for language and methodology issues, detecting plagiarism, and recommending suitable reviewers.

2. **Big Data Analysis:** Using machine learning to extract patterns, find relevant sources, and predict future research trends.

3. **Report Automation:** Summarizing papers and generating analytical reports to help **Journal of Posthumanism**

researchers grasp key trends quickly.

4. **Open Access Advancement:** Supporting open-source AI platforms for research accessibility, better archiving, and semantic search.

5. **Researcher Support:** Using AI chatbots to answer questions, suggest sources, and provide text analysis tools for faster comprehension of complex materials.

Methodological Framework

This study adopted a **descriptive-analytical methodology** to analyze the role of artificial intelligence in the dissemination and sharing of scientific production. Data were collected through a structured **questionnaire** designed around five main axes. Each axis included a series of questions aimed at assessing the effectiveness of AI as an independent variable on scientific publishing as a dependent variable.

The study sample was purposive, comprising all faculty members in the Department of Information Science, totaling 23 participants. The analysis relied on basic descriptive statistical tools, including frequencies and percentages.

Results and Data Analysis

Axis 1: General Characteristics of Study Participants



• Academic Rank:

It is clear from Figure (1) above that the rank of Assistant Professor is the majority of the sample members at (50%), followed by the rank of Lecturer at (32%), then (9%) for each of the ranks of Associate Professor and Teaching Assistant as shown in Figure (1). This distribution indicates that the majority of the participants in the study belong to the rank of Assistant Professor, which may reflect the interest of this group in particular in the subject of the study.

• Specializations:

Participants were grouped into four main categories

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Figure (2) above shows that the distribution of the respondent study sample is specialists in information science and related research (43%), followed by library science specialists (22%) and knowledge management sciences (13%), which greatly enhances the value of the study due to the experience of these specialists and their deep understanding of the nature of scientific production and potential applications of artificial intelligence in it, in addition to the contribution of other related specializations in providing comprehensive and diverse insights into the topic under study.

Years of Experience



Figure (3) above illustrates the distribution of years of experience in their field of specialization among the study participants. The accompanying figure reveals that the largest proportion of sample members had more than 15 years of experience (39%), followed by those with 5 to 10 years of experience (31%). The two categories of experience (10 to 15 years) represented 17% and less than 5 years (13%). This distribution indicates that most participants have extensive experience in their field of specialization, which may add depth and richness to the data derived from their opinions and experiences. However, the limited representation of those with less than five years of experience requires caution when analyzing the results, to ensure that the perspectives of this group are not overlooked or that the results are not interpreted in light of this disparity in experience.

Axis 2: Awareness and Use of Artificial Intelligence



The results of Figure (4) above indicate that there is widespread adoption of these technologies among the study sample. (61%) indicated that they used artificial intelligence tools in their research, while another large percentage (39%) did not. This indicates that artificial intelligence is no longer just a theoretical concept, but has become a practical tool that is actually used in the research activities of most sample members.

Popular Tools Used



Figure (5) above highlights the dominance of academic research tools such as Google Scholar and ResearchGate, with 91% of respondents using them in their research, confirming their utmost importance in accessing information. This is followed by the use of writing and text generation tools such as Grammarly and Quill Bot at 73%, reflecting a trend toward leveraging technologies to improve writing quality. Text analysis tools such as NLP Tools were used at 36%, data analysis tools such as Python.r at 23%, and finally, Market Brew at 5%. It is worth noting that participants could select more than one answer, meaning that these percentages reflect the prevalence of each tool among the sample in general, rather than a distribution of the exclusive use of a single tool per individual.Areas of AI Application in Research





Figure (6) above shows an analysis of the areas of AI use in research. Academic writing tops the list of the most used areas, accounting for 81% of the total, reflecting a significant reliance on AI tools in formulating and improving scientific content. This is followed by research design, accounting for 67%, demonstrating the growing role of AI in systematic research planning. Big data analysis comes in third place, accounting for 43%, highlighting the importance of AI in handling big data. Meanwhile, AI use in literary analysis and model and algorithm development is equal, accounting for 29% each. In contrast, automated analysis is the least used area, accounting for 6%. It should be noted that participants were able to select more than one answer, so these percentages reflect the prevalence of AI use in each area among the sample. **Axis 3: Training and Support**

Need for Training



Figure (7) shows a survey of sample members' opinions regarding the need for additional training courses to enhance the use of AI in research. The results showed that a large majority of participants, 87%, believed there was a "definite need" for these courses, reflecting a widespread awareness of the importance of AI in research and a possible gap in the skills needed to utilize it. In contrast, 13% believed it was not necessary. Overall, these results indicate a high degree of agreement among sample members on the need to provide specialized training to support the use of AI in research, underscoring the importance of investing in developing researchers' skills in this field. These results also reflect a growing awareness among sample

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members of the importance of AI in research and a strong desire to acquire the skills necessary to utilize it, perhaps due to the rapid development in this field and the sense of need to keep pace with it to improve the quality and efficiency of research, in addition to expectations of its future increasing importance in academic circles. Training Needs



Figure (8) above shows a diversity of needs among sample members. Advanced courses in artificial intelligence topped the list of desires at 87%, reflecting a strong interest in deepening theoretical understanding of artificial intelligence. This was followed by equal interest at 48% for both specialized workshops on tools and courses in the fields of writing and textual analysis, indicating a practical need to acquire specific applied skills in these fields. Training on big data analysis also received a high demand rate of 57%, confirming the importance of artificial intelligence in dealing with big data in modern research.

In contrast, the results showed less interest in guidance on how to use artificial intelligence in literary research at 39%, and a course on applying algorithms, which was the least requested at 22%. Overall, these distributions emphasize the need to provide diverse training programs that meet the different needs of researchers, from building a solid theoretical foundation to acquiring specialized practical skills in using artificial intelligence tools and applications in diverse research contexts.

Axis 4: The Impact of AI on Research Output

• Perceived Quality Improvement

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The results of Figure (10) show that a large majority of the sample believes that AI has a positive role in improving the quality of their research. Fifty-two percent of them believe it has helped "a great deal," while another 40% believe it has helped "to some extent." This indicates that most of the researchers included in the sample emphasized the benefits of using AI tools and techniques in enhancing the quality of their research output. In contrast, a small percentage (4% each) believed that the impact of AI was "not noticeable" or that it "did not help" in improving the quality of their research. This may reflect that this percentage of researchers has not used AI tools effectively. Overall, these results confirm the increasing value researchers see in using AI to improve the quality of their research and encourage the continued exploration and application of these technologies in various research fields. The study also asked about the types of contributions achieved by implementing AI techniques in scientific research, and the answers were as shown in Table (1) below

Contribution Area	Significantly	Moderately	Not at All
Accelerated Publishing	48%	35%	17%
Discovery of New Topics	70%	22%	8%
Literature Review Enhancement	56%	35%	9%
Reduction of Human Errors	57%	39%	4%

Detailed Contributions of AI:

By examining Table (1) above, it is clear that the majority of the sample believes that AI contributes to accelerating the process of publishing scientific research, with 48% believing it helps significantly and 35% believing it helps somewhat. A small percentage (17%) sees no impact in this regard. This indicates a widespread belief that AI tools can contribute to facilitating and streamlining the post-research stages leading up to publication.

There is a broad consensus that AI has helped discover new dimensions or topics in scientific

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research, with 70% believing it has helped significantly and 22% believing it has helped somewhat. A very small percentage (8%) have not benefited from AI in this regard. This result highlights AI's ability to analyze large amounts of data and uncover new insights and trends that may not be apparent to researchers.

The majority of the sample agrees that AI can improve the literature review process in their research, with 56% believing it can improve significantly and 35% believing it can improve somewhat. A small percentage (9%) disagree with this view. This indicates a recognition of AI's potential to speed up and facilitate the process of reviewing relevant sources and identifying knowledge gaps.

There is broad agreement that AI can contribute to reducing human error in scientific research, with 57% believing it can contribute significantly and 39% believing it can contribute somewhat. A very small percentage (4%) do not believe this. This result reflects confidence in AI's ability to automate some processes and reduce the likelihood of human error.

Overall, the data show a very positive view among respondents of AI's contributions to various aspects of the research process, from discovering new topics to accelerating publication and reducing human error. There is widespread recognition of AI's potential to develop and improve scientific research.

Challenge	Frequency	Percentage
Incompatibility with Arabic Language Tools	17	74%
Lack of Training / Tool Awareness	12	52%
Lack of Technical Support	8	35%
Difficulty Using Technical Tools	6	26%
Data Analysis Training as a Challenge	1	4%

Axis 5: Challenges and Future Directions

The results of Table (2) above highlight that the lack of Arabic-compatible tools is the biggest challenge facing respondents when using AI in their research, as cited by nearly three-quarters of participants (74%). This indicates a significant gap in the availability of AI tools specifically designed to support the Arabic language in research contexts.

This is followed by a lack of training or awareness of available tools (52%) as another major challenge, underscoring the importance of providing training programs and workshops to familiarize researchers with available tools and how to use them effectively.

The lack of technical support (35%) and the difficulty of using technical tools (26%) also represent significant challenges that need to be addressed by providing adequate technical support and designing more user-friendly tools. Interestingly, training in big data analytics was

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not mentioned as a major challenge (4%), which may indicate that respondents already have some knowledge or training in this field, or that it is not a major focus of their AI research.

Overall, these results point to the need to focus on developing AI tools that support the Arabic language and providing comprehensive training programs and effective technical support to overcome the obstacles researchers face when integrating AI into their research.

Conclusion

• The majority of respondents were Assistant Professors, a group actively involved in academic research.

- **64%** had frequent exposure to AI concepts, reflecting a high level of awareness.
- **87%** expressed an urgent need for AI training programs.
- **92%** affirmed that AI enhanced their research quality.

• Major contributions included accelerating publication, discovering new research themes, refining literature reviews, and minimizing human errors.

• The primary challenge was the **limited availability of Arabic-supportive AI tools** (74%), followed by lack of training (52%).

Recommendations

1. Encourage participation in **certified AI training programs** such as the "OCA AI Program".

2. Promote AI-driven workshops to **exchange knowledge and practical experience**.

3. Expand the **use of diverse AI applications** in research, emphasizing critical and ethical evaluation.

4. Invest in **developing Arabic-language AI tools** and provide training to optimize their usage.

5. Recruit **faculty members specialized in AI** to bridge the gap between technology and scientific disciplines.

6. Integrate **AI-focused coursework** into university curricula to boost awareness and application.

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