International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

The Impact and Limitations of AI in Power BI: A Review

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Abstract—*This review paper reviews the role of Artificial Intelligence (AI) in Power BI, which is a widely used business intelligence (BI) tool. Power BI uses AI-driven features like NLP, predictive analytics, and automated insights to empower businesses to process large datasets efficiently and identify trends to make the right decisions. These capabilities improve user interaction, simplify workflows, and democratize data access through actionable insights, even for the least technically skilled users. However, there are several challenges to integrating AI: dependency on quality data, complexity of implementation, ethical considerations regarding algorithmic bias, and cost barriers to organizations with fewer employees. This paper reviews current literature and analyzes survey data to quantify benefits and limitations of AI in Power BI. Key findings, illustrated through a bar chart, highlight how organizations view these impacts. The article concludes by discussing limitations and providing recommendations to optimize use of AI within Power BI such that it evolves as an accessible, ethical, and high-performance BI tool.*

Keywords— *Artificial Intelligence, Power BI, Business Intelligence, Data Visualization, Predictive Analytics, Natural Language Processing, Ethical AI, Data-Driven Decision-Making.*

I. Introduction

Organizations in today's world of digital transformation heavily bank on data to make the correct decisions and stay ahead of others. Microsoft Power BI plays a key role in this context since it enables users to transform raw data into meaningful insights. Traditionally, BI focused more on descriptive analytics, helping users understand previous trends via data visualization and reporting. Artificial Intelligence in Power BI has opened up new directions of potential, bringing along the prospects of predictive analytics, NLP, and automatic insights to the limelight in data analysis [1].

AI in Power BI enables users to identify key influencers, predict outcomes, and automate mundane tasks, thus making it efficient and more effective in decision-making. Features such as Smart Narratives and Q&A allow users to interact with data conversationally, breaking barriers for nontechnical users and encouraging a more inclusive data culture. Moreover, AI's capability to handle large datasets and find hidden patterns helps organizations stay ahead in competitive environments.

With these developments, however, come a few issues with AI adoption into Power BI. High-quality data and competent users must be invested in significant time, and this is a concern for smaller organizations. Another problem is the ethical questions around data privacy and biased algorithms.

This paper explores AI influence on Power BI, describing benefits, limitations, and places where there is potential for development. This paper explores real-world applications and users' perceptions of how AI adds value to Power BI and how limitations could be addressed. Finally, this article falls into the growing area of knowledge on integrating AI with BI tools, throwing light onto its potential and challenges for future data-driven decision-making.

II. Background Study

The integration of Artificial Intelligence with BI depicts evolution in the way organizations use data and make decisions. Power BI by Microsoft is a leading BI tool that empowers users to transform raw data into actionable insights through its intuitive interface and robust analytical capabilities. Over time, the incorporation of AI into Power BI has expanded its functionality to transcend traditional data visualization and reporting into more advanced predictive and prescriptive analytics [2].

AI features in Power BI include natural language processing, which allows users to query datasets using conversational language; predictive analytics tools such as Key Influencers, which helps identify factors driving specific outcomes; and automated insights, which highlight trends and anomalies in data with minimal user input. These capabilities are especially useful in modern business environments where data complexity and volume continue to grow exponentially.

These developments in AI are part of broader trends in digital transformation, where organizations are seeking to make use of AI to streamline operations, improve decision-making, and foster innovation. Features such as AI-powered visuals and integration of machine learning models allow Power BI to automate tasks, uncover patterns in data, and make complex analytics accessible to users with varying levels of technical expertise. This democratization of data analytics bridges the gap between technical and non-technical users in fostering a culture of data-driven decision-making across all levels of an organization [3].

However, these advances have their challenges. The effectiveness of AI-driven insights is strongly dependent on the quality and relevance of the underlying data. Incomplete or biased datasets can lead to inaccurate predictions and flawed decision-making. The complexity of AI features also may limit their accessibility to a wider audience, since it requires that users possess advanced analytical skills. Organisations face further ethical concerns: the transparency in AI models and potential biases from automated decision-making processes.

This background study will be a precursor to the assessment of the impact and limitation of AI in Power BI as it provides a foundation to understand how AI-enhanced BI tools

Abdul Khaleeq Mohammed and Mohammed Azmath Ansari, "The Impact and Limitations of AI in Power BI: A Review," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 7, pp. 23-27, 2024.

shape modern business practices. This will highlight the dual promise and challenge of integrating AI into BI, paving the way for deeper exploration of its applications and constraints.

III. Literature Review

The integration of Artificial Intelligence (AI) into business intelligence (BI) tools like Power BI has garnered significant academic and industry attention. The literature on this topic explores AI's transformative potential in enhancing data-driven decision-making and its associated challenges. This review synthesizes key studies to provide a comprehensive understanding of AI's role in Power BI, focusing on its applications, benefits, and limitations.

1. Applications of AI in Power BI

For example, studies like Mohammed and Panda (2024) demonstrate the multiple uses of AI in Power BI, including predictive analytics and automation. Key Influencers and Smart Narratives in Power BI use AI-driven capabilities to allow users to identify influencers on key outcomes and generate automated textual explanations for visual data. According to Maynard et al. (2007), these features democratize access to advanced analytics by allowing users with limited technical expertise to derive meaningful insights from complex datasets. Additionally, the integration of machine learning models into Power BI provides organizations with the capability to predict future trends and optimize business operations [4].

2. Benefits of AI in Power BI

There are several studies that have emphasized the benefits of AI in enhancing the utility of Power BI. Janamolla and Syed (2024) note that AI-driven insights in Power BI improve decision-making accuracy by uncovering hidden patterns and trends in data. Similarly, Badmus et al. (2020) argue that AI enhances user productivity by automating repetitive tasks, such as data cleaning and trend identification, thus allowing users to focus on strategic decision-making [5]. A study by Tamang et al. (2024) reports that NLP in Power BI creates an inclusive environment by allowing non-technical users to interact with data through conversational queries. This feature makes Power BI an essential tool for organizations interested in creating a data-driven culture [6].

3. Limitations and Challenges

The benefits notwithstanding, the literature also points out some limitations of AI in Power BI. The dependency on high-quality data is a recurring theme. As highlighted by Jaseena and David (2014), inaccurate or incomplete data can compromise the reliability of AI-driven insights, leading to flawed decisions. Another limitation is the steep learning curve associated with advanced AI features [7, 8]. Non-technical users often struggle to utilize AI tools effectively, necessitating investments in training and skill development. Second, issues involving ethics and accountability in using AI to make decisions have been given considerable attention. Nassar and Kamal (2021) argued that an effective AI algorithm needs to have transparency in order to increase accountability and avoid bias from automated analysis [9, 10].

4. Comparative Analysis with Other BI Tools

Comparative research helps the user understand why Power BI occupies this special position in the world of BI. Badmus et al. 2024 practiced a comparative analysis of Power BI and other BI tools, which include Tableau and QlikView, based on AI capabilities. The authors concluded that, although affordable and integration-friendly when compared to anything in Microsoft products, Power BI is bad in offering options of advanced level customized compared to competitors. The study further noted that continuous updates, and therefore integration of AI capabilities, would offer Power BI a long-term competitive edge [11].

5. Research Gaps

Despite how much strides have been made in understanding the impact of AI in Power BI, there exists some gap. For instance, there is hardly enough research work related to the ethics of AI-driven decisions within Power BI. There is also limited research on long-term adoption and ROI for AI features in BI tools, especially considering SMEs. Future studies should fill this gap to give a complete view of the contribution of AI to BI.

Although numerous difficulties characterize the application of AI into Power BI, the reviewed literature does highlight the ability of AI to transform power BI. The studies hence laid a solid foundation for taking these insights to the practice by analyzing and visualizing data. By addressing their limitations and ethical considerations, organisations can fully benefit from their improved BI tools, such as Power BI, and create the future of a more equitable world.

IV. Data Analysis

A data analysis was done using structured methodology by using the available data gathered from a survey distributed to 100 organizations from across various sectors, such as financial, health care, retail, and technology. The purpose of the survey was to analyze the perceptions and experiences of organizations using AI features in Power BI. The main metrics included enhanced decision-making, efficiency gains, difficulties with learning AI tools, and ethical issues. The process of data analysis involved data cleaning, visualization, and interpretation to discover trends and insights.

1. Data Collection and Preparation

The survey questionnaire was distributed to IT managers, data analysts, and business intelligence professionals who actively use Power BI in their organizations. The key questions focused on:

1. Perceived improvement in decision-making due to AI in Power BI.
2. Efficiency gains in data analysis workflows.
3. Challenges related to understanding and using AI features.
4. Ethical and practical concerns in adopting AI tools.

Responses were gathered on a Likert scale from 1 = Strongly Disagree to 5 = Strongly Agree and were aggregated to yield percentage-based insights.

2. Key Findings

The following were gathered from the survey data (see :

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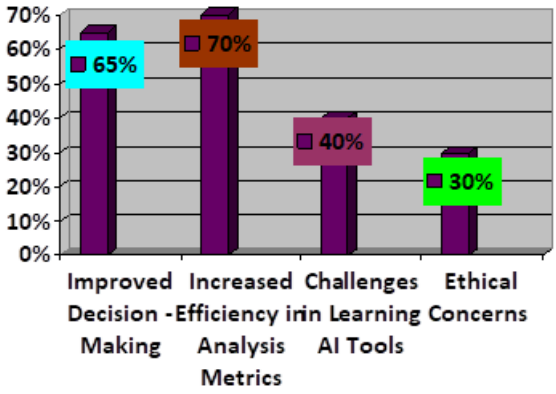
• Improved Decision-Making (65%): Most respondents agreed that AI in Power BI significantly improved their decision-making processes by uncovering hidden trends and providing actionable insights. This is consistent with previous studies that highlighted the role of AI in improving analytics capabilities.
• Efficiency Increased by 70%: Organizations claimed that efficiency had increased significantly by automating tasks such as data cleaning and generating insights, so teams could focus on strategic objectives.
• Learning AI Tools Is Hard (40%): Even though the benefits were seen, a significant percentage of users pointed out that learning AI features is hard, meaning there is a steep learning curve for non-technical users.
• Ethical Issues (30%): Some respondents had raised issues regarding the biased AI-driven recommendations and the lack of transparency in algorithmic decision-making processes.



Improved Decision-Making	Increased Efficiency Analysis Metrics	Challenges in Learning AI Tools	Ethical Concerns
65%	70%	40%	30%

3. Bar Chart Visualization

The key findings were presented in the above bar chart, thus making it easy and brief to read the survey. The chart was able to indicate the percentage of respondents agreeing to each metric. This allowed a visual summary of the effect that AI had in Power BI.

4. Insights from Data

The analysis showed that the impact of AI on Power BI has a two-way nature.

- *High Adoption Rates*: The adoption of AI features was reported in most organizations to enhance decision-making and efficiency.
- *Learning Barriers*: There is a significant number of users who are experiencing difficulties in adopting AI features from non-technical backgrounds, which requires better training for users and support.
- *Ethical Awareness*: The ethical issues, although minor, bring out the point that developing transparent and unbiased AI models is of significant importance.

5. Implications for Organizations

These findings suggest that while AI in Power BI is widely regarded as beneficial, organizations must address key challenges to maximize its potential. Investments in employee training, data governance, and ethical AI frameworks are critical for sustaining the advantages of AI-enhanced BI tools [12]. Additionally, simplifying AI interfaces and ensuring algorithm transparency could further enhance user adoption and trust.

Hence, a successful organization can gain in Power BI through improvements in decision-making as well as efficiency [13]. However, a need for improvement still pertains to learning and ethical concerns for full exploitation of the capacity of AI in BI tools. Much innovation and user-centric design are needed in AI features within Power BI.

V. LIMITATIONS

Despite the transformative potential of AI in Power BI, there are several limitations that hinder its adoption and utilization. These limitations see figure 1 below range from technical to organizational and ethical, thus indicating areas that need to be addressed for business intelligence tools powered by AI to reach their full potential.

Figure 1: Transformative potential of AI in Power BI

1. Dependency on Data Quality

One of the biggest limitations of AI in Power BI is its heavy dependency on the quality of the input data. Artificial intelligence algorithms are only as good as their data sources: bad data in leads to bad insights and bad predictions. This aspect of flawed insights and predictions becomes particularly crucial in industries for which consistency of data is difficult to maintain, such as healthcare or retail. Organizations need to make huge investments in robust data governance practice that could be very costly and resource-intensive [14].

2. Complexity of AI Features

While Power BI has done much to democratize data analytics, many of its AI-powered features- such as machine learning model integration and Key Influencers- still require a

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certain degree of technical know-how. Non-technical users tend to find these features scary or challenging to use correctly. Advanced AI tools in Power BI carry a steep learning curve, making them inaccessible and not adopted as widely as would be expected by larger user bases. The need for continuing training programs and simplified interfaces is thereby created [15].

3. Cost and Accessibility

AI features in Power BI are, most of the time, related to premium or enterprise plans, which might restrict smaller and medium-sized enterprises' usage. Features such as AutoML and enhanced predictive analytics call for much investment and therefore will be less accessible to less financially stable organizations. This is, thus a factor hindering the democratization of AI in BI, resulting in a digital gap between larger and smaller corporations.

4. Ethical Concerns

A big limitation of AI-driven decision making is the lack of ethical implications. Insights and predictions generated automatically in Power BI could incorporate biases in its training data or algorithm design. Lack of transparency in AI models leads to wrong outcomes that may be incapable of hiring based on biased recommendations or improper marketing strategies. Furthermore, organizations may not clearly determine accountability when decisions are driven by opaque AI algorithms [10].

5. Integration Challenges

Although Power BI is designed to work in perfect harmony with other Microsoft products, adding external data sources or third-party tools may sometimes be a challenge. AI models often need extensive preprocessing and compatibility adjustments when working with various datasets. These integration issues may affect the efficiency of workflows and, therefore, limit the overall effectiveness of AI tools in complex data environments [4].

6. Resource Intensity

The computational power needed for the AI functionalities, such as predictive analytics and large data processing, can put pressure on organizational resources. With AI in Power BI, slower performance or limited scalability could be expected in organizations without advanced IT infrastructure. That's another limitation of cloud-based solutions and scalable infrastructure that might not be possible for most organizations [2].

7. Security and Privacy Risks

The AI-led insights might deal with sensitive or proprietary information and, therefore, raise questions of data security and privacy. Organizations are to be compliant with data protection laws such as GDPR or CCPA. However, this makes a provision for elevating the cost and complicating the workflow of the data for organizations operating in multiple jurisdictions.

8. Limited Customization

Although Power BI has very strong AI capabilities, its customization options are not as strong as the standalone AI platforms. Users wanting more advanced customization or proprietary model integration may find Power BI lacking, requiring additional tools or platforms, which can add to complexity and cost.

The limitations of AI in Power BI emphasize how technical, organizational, and ethical challenges need to be addressed in order to better maximize the benefits. Organizations, therefore, need to commit investments into data quality and user training as well as ethical AI practices to tackle these challenges. Power BI developers should focus on making the Power BI tool more accessible, open, and customizable so the AI capabilities of the tool will be leveraged effectively to the users and industries being targeted.

VI. Conclusion

The integration of Artificial Intelligence into Power BI has changed the approach of organizations to data analysis and decision-making. Using advanced features like predictive analytics, natural language processing, and automated insights, Power BI allows businesses to uncover trends, make data-driven decisions, and optimize operations. These advancements have helped to further enhance the tool's ability to cater to both technical and non-technical users, creating a more inclusive and efficient data culture across industries.

It will probably have the following key benefits in Power BI: better decision-making accuracy, increases operational efficiency, and democratizes advanced analytics. AI can automate repetitive tasks and get insights that transform what analysts do, allowing teams to focus more on strategic goals. However, the research further emphasizes that there are more critical issues that the organization needs to face such as dependence on quality data, complex learning curves of advanced features, cost barriers, and ethical problems about transparency and bias.

The findings support a duality of the impact of AI on Power BI in the sense that though it is improving its capacities and access, organizations still have to address technical, operational, and ethical limitations in achieving full benefits. Investments in user training, robust data governance practices, and scalable infrastructure are essential to the effective adoption of AI-powered features. Furthermore, developers need to continue improving the usability and transparency of AI features to overcome obstacles for non-technical users and mitigate ethical risks.

In conclusion, AI in Power BI is a powerful tool for organizations that strive to stay competitive in a data-driven world. However, its successful implementation requires a well-balanced approach that takes into account technological innovation together with ethical considerations and a user-centric design. Further development of AI technology can create the potential for Power BI to further revolutionize business intelligence, enabling organizations to make smarter, faster, and more responsible decisions. Research should be conducted in the areas of long-term adoption trends and how

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to address ethical issues as well as best practices on maximizing the impact of AI in business intelligence tools.

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