

# A Study on Impact of AI in Decision Support Systems at Stigmata Techno Solutions

**Mr. ROHIT J T** Student, School of Management Studies, Sathyabama Institute of Science And Technology  
Chennai, Tamil Nadu, South India.

**Ms. REYYA PAWANI** Assistant Professor, School of Management Studies, Sathyabama Institute of Science And  
Technology Chennai, Tamil Nadu, South India.

## ABSTRACT:

This study explores the Decision Support Systems (DSS) which have been used to aid decision-makers in analyzing complex data, evaluating alternatives, and making informed choices. With the rapid advancement of Artificial Intelligence (AI), DSS have evolved significantly, integrating intelligent algorithms, machine learning models, and automation to enhance decision-making accuracy and efficiency. This study examines the transformative impact of AI on DSS, exploring how AI technologies such as predictive analytics, natural language processing (NLP), deep learning, and expert systems contribute to improved decision-making processes across various industries. The research focuses on key areas where AI-driven DSS provide a competitive advantage, including data-driven decision-making, real-time analytics, risk assessment, and process optimization.

## KEYWORDS:

Decision Support Systems (DSS), Decision-making, Artificial Intelligence (AI), Machine Learning, Predictive analytics, Natural Language Processing (NLP).

## INTRODUCTION:

In today's data-driven world, organizations across various industries rely heavily on Decision Support Systems (DSS) to analyze complex data, evaluate alternatives, and make informed decisions. A Decision Support System is a computer-based tool that assists decision-makers by processing large volumes of information and generating insights to facilitate strategic planning, problem-solving, and operational efficiency. Traditionally, DSS utilized rule-based algorithms and structured data processing. However, the advent of Artificial Intelligence (AI) has revolutionized these systems, making them more adaptive, intelligent, and capable of handling vast and dynamic datasets.

AI-powered DSS integrate machine learning (ML), deep learning, natural language processing (NLP), and predictive analytics to enhance decision-making capabilities. These systems can automate data analysis, recognize patterns, provide real-time insights, and make predictions with high accuracy. Industries such as healthcare, finance, supply chain management, and governance have significantly benefited from AI-driven DSS. For instance, in healthcare, AI-enabled DSS assists doctors in diagnosing diseases, predicting patient outcomes, and recommending personalized treatments. In finance, AI-powered systems analyze market trends, detect fraudulent activities, and optimize investment decisions. Similarly, in business operations, AI-enhanced DSS help organizations streamline processes, improve risk assessment, and optimize resource allocation.

## OBJECTIVE OF THE STUDY:

- To analyze the role of AI in enhancing decision-making processes across various industries.

- To evaluate the effectiveness of AI-powered Decision Support Systems (DSS) in comparison to traditional DSS.
- To identify key AI techniques (such as machine learning, natural language processing, and expert systems) used in decision-making.
- To assess the benefits and challenges of AI in DSS, including accuracy, speed, and ethical concerns.
- To develop key recommendations for businesses and organizations on integrating AI into their DSS for optimal performance.

#### REVIEW OF LITERATURE:

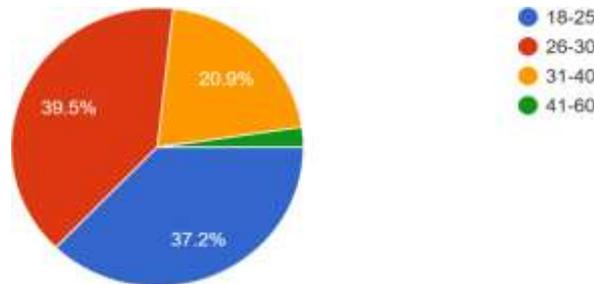
- **Keen and Morton (1978)** defined DSS as computer-based systems aiding managerial decision-making using structured data and models. As technology evolved, **Power (2002)** emphasized the shift toward more intelligent, adaptive systems incorporating AI capabilities such as machine learning, natural language processing, and neural networks.
- **Rajkomar et al. (2018) and Obermeyer et al. (2019)** found that AI-powered Clinical Decision Support Systems (CDSS) improve patient outcomes by enabling faster and more accurate diagnoses, predicting disease progression, and personalizing treatments through advanced data analytics.
- **Brynjolfsson and McAfee (2017)** highlighted AI's role in transforming financial DSS by enhancing fraud detection, automating credit risk assessment, and supporting real-time algorithmic trading. **Chen et al. (2020)** supported this by demonstrating how machine learning models can improve credit scoring and reduce decision-making errors.
- **Ivanov et al. (2019)** emphasized the role of AI in improving supply chain resilience by forecasting demand, detecting disruptions, and optimizing inventory and transportation through real-time data and predictive modeling.
- **Davenport et al. (2020)** showed that AI-driven DSS support better customer segmentation, behavior prediction, and content personalization, resulting in more effective campaigns, increased ROI, and improved customer satisfaction.
- **Ribeiro et al. (2016)** pointed out the issue of AI models being "black boxes," where users are unable to interpret or trust the decisions made. This has led to increasing interest in *Explainable AI (XAI)* frameworks to make AI decisions more transparent and understandable.
- **Bolukbasi et al. (2016)** demonstrated how biased training data can lead to discriminatory AI outputs, particularly in sensitive areas such as recruitment, lending, and law enforcement. The need for fairness-aware algorithms and ethical guidelines is a recurring theme in recent literature.

#### METHODOLOGY OF THE STUDY:

The research methodology outlines the approach, techniques, and tools used to study how AI optimizes business processes. This section details the research design, data collection methods, data analysis techniques, and the scope of study to ensure a comprehensive understanding of AI's role in business process optimization.

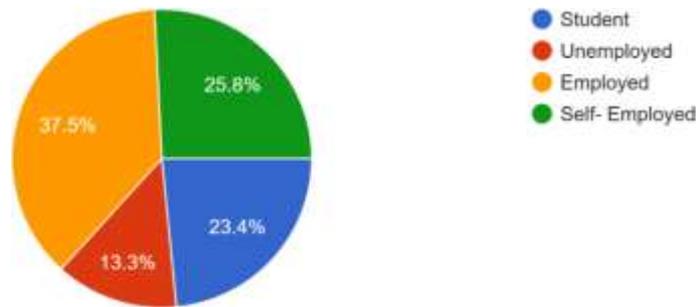
**DATA ANALYSIS:**

**1. Chart representing demographic details of the respondents**



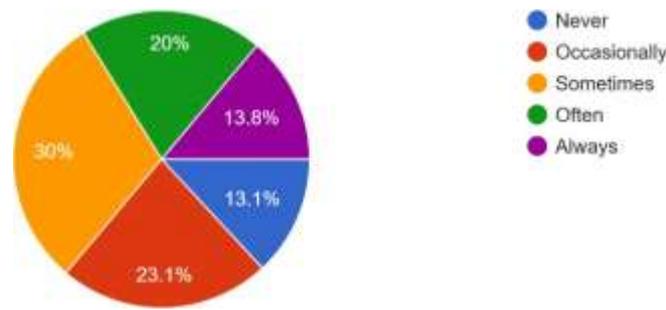
From the chart 1 out of 130 respondents, 39.2% of the respondents belong to the 26-30 years age group, making them the majority. The 18- 25 years age group consists of 37% respondents, followed by 20.7% respondents in the 31-40 years category. The lowest number of respondents, 3.7%, fall in the 41-60 years category.

**2. Chart representing occupation of the respondents**



From the chart, it is seen that out of 130 respondents, the majority, 37.5%, are Employed candidates, followed closely by 25.8% respondents who are self-employed. A smaller portion, 23.4%, are students, while only 14.6% are Unemployed.

**3. Chart representing frequency of use of the AI techniques such as Machine Learning, Neural Networks, or Predictive Analytics of the Respondents**



## INTERPRETATION

From the chart, it is seen that out of 130 respondents, the majority, 30.0%, says Sometimes, followed closely by 23.1%, says occasionally. A smaller portion, 20.0%, says often, while 18 (13.8%), says always, while only 17 (13.1%), says never.

## CONCLUSION:

This study concludes that Artificial Intelligence (AI) plays a significant role in enhancing decision-making processes by improving accuracy, reducing human bias, increasing efficiency, and enabling faster outcomes. The findings from the weighted average rank method indicate that efficiency enhancement, trust in AI insights, **and** reliability are the most influential factors driving the adoption of AI in decision-making. However, the study also highlights ongoing concerns regarding ethical issues, privacy, and human oversight, which affect users' willingness to fully trust and adopt AI-driven strategies. The chi-square analysis further reveals a significant association between demographic factors—such as marital status and educational qualification—and the level of motivation to adopt AI technologies, suggesting that personal background plays a role in how AI is perceived. To foster greater adoption, organizations must focus on transparency, ethical AI use, and awareness-building among users. Proper education, supportive policies, and responsible implementation strategies are crucial in addressing skepticism and enhancing trust in AI systems. Overall, the integration of AI in decision-making holds great promise, but it must be approached with a balance of innovation and responsibility.

## REFERENCE :

Binns, R. (2018). Fairness in Machine Learning: Lessons from Political Philosophy. *Proceedings of the 2018 Conference on Fairness, Accountability and Transparency*, 149–159.

Brynjolfsson, E., & McAfee, A. (2017). *Machine, Platform, Crowd: Harnessing Our Digital Future*. W. W. Norton & Company.

Dastin, J. (2018). Amazon scrapped 'secret' AI recruiting tool that showed bias against women. *Reuters*.

Davenport, T. H., & Ronanki, R. (2018). Artificial Intelligence for the Real World. *Harvard Business Review*, 96(1), 108–116.

Dwivedi, Y. K., Hughes, D. L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994.

European Commission. (2020). *Ethics Guidelines for Trustworthy AI*.

Gartner. (2020). *Top Trends in Data and Analytics for 2020*.

Ghosh, R., & Scott, J. E. (2018). Using AI to make decisions: A study of trust in algorithmic decisions in high-stakes contexts. *MIS Quarterly Executive*, 17(4), 289–301.

IBM Institute for Business Value. (2021). *From Roadblock to Scale: The Global AI Adoption Index*.

Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making.