Artificial Intelligence Based Decision Support Systems in E-Commerce and E-Business

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***Abstract*—Decision support systems are becoming increasingly important in the field of e-commerce and e-business. This research aims to gain insight into the potential of artificial intelligence-based decision support systems for e-commerce and e-business. With the growth of digital commerce and high interest in online business operations, many businesses face many challenges in making informed and effective decisions. This research uses a literature review method with a qualitative approach. It performs in-depth analysis of literature, scientific articles, books, and other relevant sources to gather information and insights on this topic. This research aims to investigate how artificial intelligence techniques, such as machine learning, algorithms, data analysis, and expert systems, can be utilized to develop decision support systems that help online businesses. By reviewing existing literature and conducting in-depth research, this study also clarifies the implicit challenges of artificial intelligence in improving decision-making processes.**

Keywords—Artificial Intelligence, Decision Support Systems, E-Commerce, E-Business

I. INTRODUCTION

In the field of e-commerce and e-business, there has been an increase in demand for the use of decision support systems in recent years. The amount and difficulty of data generated is increasing as businesses increasingly rely on digital platforms to run their operations. Thus, decision support systems have become very important as they are effective tools for making decisions. In the e-commerce and e-business industry, a strong decision support system is required due to rapidly changing customer interests and behavior, intense business competition, and continuously evolving market trends. By using this system, companies can perfect trends that will occur and optimize strategies to increase operational efficiency so that their business is successful. Therefore, decision support systems have become an important part of the success and growth of companies in the field of e-commerce and e-business.

Artificial intelligence (AI) has helped a lot in the decision-making process. Artificial intelligence has become an important technology for organizations to make better decisions by knowing important information from large amounts of existing data. Additionally, artificial intelligence systems can automate and optimize decision-making through the use of advanced algorithms, machine learning models, data analysis, and more. Artificial intelligence systems can provide insight and recommendations by analyzing existing patterns, trends, and correlations. Additionally, its artificial intelligence system can gradually improve its decision-making capabilities by learning and adapting to new data. In the current technological era, artificial intelligence systems have a transformative effect on decision-making in various fields, such as finance, health, marketing, management, and many more.

commerce and high interest in online business operations, many businesses face many challenges in making informed and effective decisions. This research aims to investigate how artificial intelligence techniques, such as machine learning, algorithms, data analysis, and expert systems, can be utilized to develop decision support systems that help online businesses. By reviewing existing literature, reviewing case studies, and conducting in-depth analysis, this research also explains the implicit rise of artificial intelligence in improving the decision-making process. Ultimately, the goal of this research is to contribute to the understanding of how artificial intelligence can be used to make decisions that support systems in online business, as well as provide valuable insights for researchers, practitioners, and organizations operating in this rapidly evolving digital era.

II. LITERATURE REVIEW

A. Decision Support Systems in E-Commerce and E-business

Decision support systems are computer-based systems that use data, models, and knowledge to support the decision-making process [1]. In terms of e-commerce and e-business, decision support systems (DSS) are becoming increasingly important. DSS helps organizations make informed choices by combining information technology, data analysis, and decision-making models. Additionally, decision support systems are also responsible for strategic planning, customer relations, inventory, and supply chains in a business. Thus, decision support systems enable companies to analyze, lock, and make good use of data originating from online platforms, market trends, and customer interactions. Furthermore, decision support systems can also refine requests, optimize strategic business, help customers, and improve business performance for the better in the future. This is especially important in the fast-paced and highly competitive e-commerce and e-business environment as it can help make quick and effective decisions. Therefore, decision support systems have become a very important tool for organizations that want to dominate their competitors in the digital market by utilizing various information from data.

B. Types of Artificial Intelligence

Artificial intelligence techniques help machines analyze large amounts of data, gather important information, process and understand what is happening, and make intelligent predictions or decisions. Furthermore, artificial intelligence has the goal of driving innovation and helping solve problems.

1) Machine Learning

Machine learning allows systems to learn and improve from experience without being explicitly programmed [2]. This will involve developing algorithms to be able to recognize a pattern, make predictions, and take action based on compromised information. Machine learning has developed in various forms, such as speech and image

recognition, fraud detection, and personalized recommendation systems.

2) Algorithm

An algorithm refers to a sequence of instructions or step-by-step procedures designed to solve a specific problem or complete a task using artificial intelligence techniques [3]. Algorithms are created to enable machines to process data, make decisions, and perform intelligent actions. In addition, algorithms are also used in various ways such as machine learning algorithms, optimization algorithms, search algorithms, and clustering algorithms, each of which is designed to solve different types of problems and data structures.

3) Expert System

An Expert System is a computer-based system that imitates human decision-making abilities in a certain form [4]. This system relies on knowledge and rules obtained from human experts and stores them in a knowledge base. Additionally, expert systems can analyze data, provide recommendations, and make decisions in a similar way to human experts. Additionally, expert systems have been used in various fields such as medicine, finance, and engineering to aid complex problem-solving and decision-making processes.

4) Data Analysis

Data analysis involves the systematic analysis and interpretation of large amounts of data to gather related information and patterns [5]. Therefore, data analysis uses statistical techniques, machine learning algorithms, and data visualization tools to discover hidden trends, correlations, and patterns in the data. By leveraging data analysis, artificial intelligence systems can make data-driven predictions, optimize processes, improve decision making, and uncover valuable insights that drive business growth and innovation.

III. Research Methods

This research uses a literature review method with a qualitative approach and conducts an in-depth look at literature, scientific articles, books, and other relevant sources to gather information and insights on this topic. Through browsing through published research, researchers can gain access to a variety of perspectives, theories, and empirical evidence that contribute to the understanding of this research topic.

This research focuses on understanding the importance of artificial intelligence-based decision support systems in improving decision-making processes for e-commerce and e-business. Not only that, this research will also provide information about the effectiveness and challenges of artificial intelligence decision systems in e-commerce and e-business based on an in-depth study of various relevant references.

IV. Result and Discussion

A. Artificial Intelligence for Decision Support in E-Commerce and E-business

1) Machine Learning

Machine learning plays an important role in the field of artificial intelligence for decision support systems in e-commerce and e-business. This is because machine learning can help in identifying customer preferences, forecasting demand, optimizing business strategies, and personalizing the shopping experience. Hence, businesses can make data-driven decisions and provide specific solutions to customers which ultimately increases customer satisfaction and helps in revenue growth. With the help of machine learning, online businesses can make better decisions that lead to increased business operational efficiency and competitive advantage over their competitors.

2) Algorithm

In e-commerce and e-business, algorithms are used to overcome various existing challenges such as fraud detection and optimizing the prices that businesses will provide to customers. By utilizing algorithms, decision support systems can process large amounts of data directly. This enables businesses to make informed decisions and improve their operations quickly. Continuous development and refinement of algorithms will contribute to the effectiveness of artificial intelligence-based decision support systems in e-commerce and e-business. As businesses strive to reach the digital realm, algorithms serve as powerful tools that organizations use to leverage data directly and remain competitive in the dynamic and ever-changing e-commerce and e-business environment.

3) Expert System

In e-commerce and e-business, expert systems can provide valuable insights and recommendations based on an expert's expertise in areas such as product knowledge, customer behavior analysis, market trends, and business management. By leveraging the expertise of these systems, businesses can make more accurate and effective decisions, improve customer experience, optimize existing management levels, and strengthen their operations. The integration of expert systems in artificial intelligence-based decision support systems contributes to improving decision-making processes, increasing business efficiency, and improving existing business performance.

4) Data Analysis

By utilizing artificial intelligence-powered decision support systems, businesses can analyze customer behavior, sales trends, market dynamics, and other relevant data to gain complete and extensive information about the business operations themselves. Data analysis techniques such as descriptive, diagnostic, predictive, and prescriptive analysis will be used by a business. This allows businesses to drive business growth and increase sales. By utilizing data analysis in decision support systems based on artificial intelligence, businesses can obtain a lot of information from data, harnessing the power of data to obtain relevant data.

B. Implications and Challenges of Artificial Intelligence Decision Support Systems in E-Commerce and E-Business

The implications of artificial intelligence for decision support systems in e-commerce and e-business have significant and far-reaching results. Artificial intelligence-enabled decision support system for e-commerce and e-business fields. First, decision support systems enable businesses to provide personalized experiences to customers by leveraging artificial intelligence algorithms to analyze large amounts of data and understand individual preferences and behavior. This aims to increase customer satisfaction, increase customer loyalty, and increase conversion rates. Second, decision support systems can drive operational

efficiency by automating ongoing management processes such as inventory, marketing, and supply chains. This results in savings in costs incurred by the business, increased allocation of resources to more important matters, and efficient business operations. Third, supporting systems can provide valuable information for making strategic decisions, thereby enabling businesses to understand market trends, customers, or business competition. This helps businesses make decisions based on product development that will be provided to customers, appropriate marketing strategies, and strategic information about expanding their online business. Overall, applying artificial intelligence to decision support systems in e-commerce and e-business helps businesses provide personalization to customers, driving management efficiency, and gaining a competitive edge in the digital marketplace.

The integration of artificial intelligence for decision support systems in e-commerce and e-business has various challenges. First, data availability and quality. Artificial intelligence-powered decision support systems rely heavily on large volumes of high-quality data for training and decision making. Obtaining and managing such data will be a complex task as it requires businesses to ensure the accuracy, privacy, and security of the data. Second, interpretability and explainability of artificial intelligence algorithms. There are so many artificial intelligence techniques that it is difficult to understand the reasons behind the decisions made by existing artificial intelligence. This will raise concerns about irrelevance, bias, and fairness. Third, the rapid progress of artificial intelligence technology demands continuous learning and adaptation. This will make businesses need to invest in updating their artificial intelligence to continue to follow developments in artificial intelligence techniques to exploit the potential of decision support systems. Fourth, legal and regulatory considerations regarding data protection and privacy have created challenges in the application of artificial intelligence in e-commerce and e-business. Therefore, overcoming this challenge requires data governance, ethical guidelines, and collaboration between several important organizations involved. By actively addressing existing challenges, businesses can optimally enable artificial intelligence for decision support systems in e-commerce and e-business.

C. *Potential Application of Artificial Intelligence-Based Decision Support Systems*

Analysis of the application of artificial intelligence in the context of e-commerce, namely the application of Dynamic Pricing, Voice and Image Based Search, Payment Verification, Chatbots, and Customer Segmentation [6].

Examples of the application of artificial intelligence in an e-business context arefacial recognition and security, data analysis and prediction, business process automation, and risk and financial management [7]. An example of a platform that provides e-commerce and e-business services is Shopee.

Shopee is a platform tailored for each region, providing an easy, safe, and fast online shopping experience through reliable payment and logistics support [8]. In applying artificial intelligence (AI) to the Shopee application, AI can make a significant contribution to improving the user's shopping experience, increasing operational efficiency, and increasing business profits.

One aspect of applying AI to Shopee is the item matching process to increase accuracy and reduce search time for items that customers want, analyze buyer preferences, and provide appropriate product recommendations.

Apart from that, AI also helps Shopee predict customer purchasing behavior, offer products that are relevant and desired by customers, and estimate delivery times more efficiently and accurately, thereby ensuring customer satisfaction.

Shopee uses AI in order processing, helping reduce operational costs and strengthen overall business management. Shopee is taking strategic steps in adopting AI technology to improve and optimize various aspects of its operations and customer experience.

Shopee also offers features for sellers (Shopee Seller), namely [9]. B2C companies focus on selling their products or services directly to customers compared to other businesses [10].

CONCLUSION

The amount and severity of data generated are increasing as businesses increasingly rely on digital platforms to run their operations. Thus, decision support systems have emerged as very important tools as they are effective for making informed decisions. Artificial intelligence has become an important technology for organizations to make better decisions by knowing important information from a large amount of existing data. The results of this research explain how artificial intelligence techniques, such as machine learning, algorithms, data analysis, and expert systems, can be utilized to develop decision support systems that help online businesses. First, machine learning can make better decisions that lead to increased business operational efficiency and competitive advantage over its competitors. Second, algorithms are used to overcome various existing challenges such as fraud detection and optimizing the prices that businesses will provide to customers. Third, expert systems can provide valuable insights and recommendations from experts so that they can make more accurate and effective decisions, improve customer experience, optimize existing management levels, and strengthen their operations. Fourth, data analysis can analyze customer behavior, sales trends, market dynamics, and other relevant data to obtain complete information. Apart from that, there are also several strengths and challenges in using artificial intelligence in decision support systems for e-business and e-commerce which make business actors actively overcome challenges to be able to utilize artificial intelligence optimally.

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