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Artificial Intelligence, Disrupted Innovation And Operational Management

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Abstract: Artificial Intelligence (AI) has become a key driver in digital transformation and disruptive innovation across various sectors, including operational management. This research discusses the relationship between AI and disruptive innovation in creating new products, improving operational efficiency, and strengthening the competitiveness of companies in Indonesia. The importance of collaboration between the government, the private sector, and society in the effective implementation of AI is emphasized. The government is responsible for providing adaptive regulations and digital infrastructure, the private sector leads technological innovation and investment, while society contributes through digital literacy and technology adoption. Research results show that AI, when applied strategically, can transform traditional business models, increase productivity, and create new opportunities in the market. Nevertheless, there are challenges such as the skills gap, ethics of AI usage, and technological access inequality that require synergy among stakeholders. In conclusion, the integration of AI with disruptive innovation not only creates a competitive business ecosystem but also provides broad social benefits if managed with a collaborative approach.

Keywords: Artificial Intelligence, Disruptive Innovation, Operational Management, Competitiveness, Collaboration, Digital Transformation.

INTRODUCTION

Artificial Intelligence (AI) is a branch of computer science that focuses on creating machines or systems that can mimic human cognitive processes, such as understanding, pattern recognition, decision-making, and problem-solving. AI serves to enhance operational efficiency and effectiveness across many sectors, from retail to banking. AI-based systems, such as machine learning (ML) and natural language

processing (NLP), are capable of analysing large amounts of data and providing deep insights that cannot be obtained directly by humans.

According to Huang and Rust (2021), AI is a key element in the service revolution, where this technology is used to enhance customer experience, optimize operations, and make data-driven decisions in real-time. AI is one of the key technologies leading major changes in the world of work and the economy, enabling companies to adapt and grow faster in facing industry challenges.

AI as a disruptive innovation brings significant changes in many sectors, replacing methods or processes that were previously done in traditional ways. The application of AI enables automation, data-driven decision-making, personalization, and predictive analytics. In the context of disrupted innovation, AI not only enhances efficiency but also creates new products and markets that did not previously exist.

The role of AI in Disrupted Innovation is as follows:

1. Identification of Problems and Opportunities. The application of AI begins with identifying areas or problems in the industry that can be optimized or disrupted. At this stage, companies or organizations identify gaps in the traditional way of running a business and seek AI-based solutions that can provide efficiency, speed, or quality improvements
2. Development of AI Technology. At this stage, AI algorithms and models are developed. This includes deep learning, machine learning, and natural language processing (NLP) that enable AI to understand and adapt to various complex problems. This technology is also trained using relevant data, allowing AI to learn and evolve over time.
3. Implementation and Integration. After the AI technology is ready, companies begin to integrate it into their business operations. This implementation can take the form of using chatbots for customer service, autonomous vehicles for transportation, or AI in financial analysis to detect fraud.
4. Scalability and Optimization. After implementation, AI continues to evolve and be adjusted based on the feedback received. The company began to expand the use of AI in various operational areas or other processes to maximize its results. At this stage, AI becomes increasingly efficient, and the company experiences greater benefits.
5. Market Disruption. At this stage, AI not only changes the way companies operate but also creates new markets and alters societal consumption patterns. New technologies generated by AI can create new business models that can replace old products or services

In the competitive business world, companies must have an edge to compete with other companies. Competitiveness helps companies maintain their market position, reducing the risk of losing customers to competitors. Competitiveness enables companies to remain relevant in the long term or with the goal of enhancing business sustainability. To achieve this, it is necessary to do things such as adapting to market changes and facing external challenges like economic crises or technological changes. With competitiveness, companies can offer greater value to customers, whether through lower prices, better quality, or product innovation. By doing these three things, companies achieve competitive advantage. The impact felt is that customers tend to be

loyal to companies that offer the best value. Competitiveness helps create products or services that better meet customer needs.

Competition motivates companies to continuously innovate, find new ways to serve customers, and expand markets. By innovating, an organization can grow and develop well. Competitive companies tend to be more efficient in utilizing resources, whether human, financial, or technological.

Based on the above description, the research problem formulation is as follows:

1. What is the impact of the implementation of Artificial Intelligence (AI) on disruptive innovation in various industrial sectors, both globally and in Indonesia?
2. What is the relationship between AI, disruptive innovation, and operational management in enhancing the efficiency and competitiveness of companies?
3. What are the challenges and opportunities faced by companies in implementing AI?

This research aims to understand the influence and application of AI in disruptive innovation, to outline the connections between AI, Disruptive Innovation, and Operational Management, to identify the challenges and opportunities that arise when companies adopt AI technology, to learn how large companies implement AI to remain competitive, and to analyse how operational management processes transform with the presence of AI and disruptive innovation.

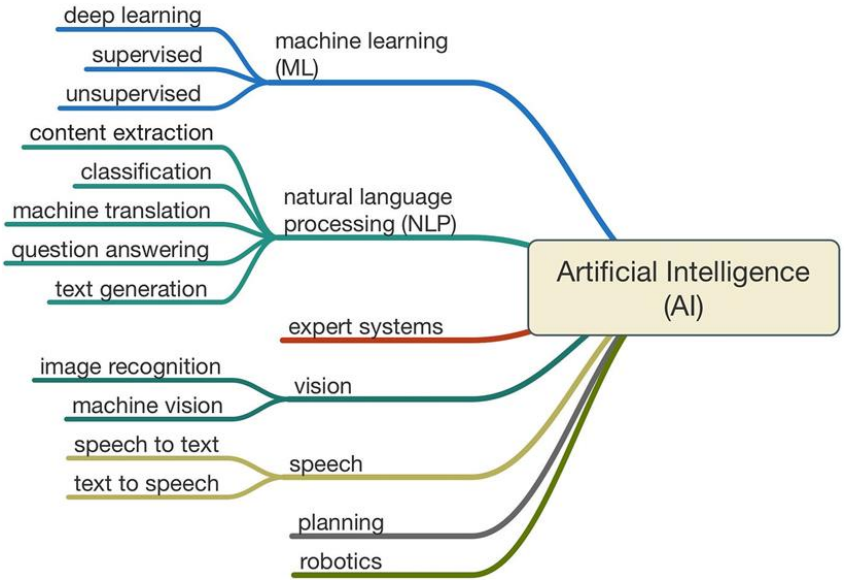
RESEARCH METHOD

This research method uses a descriptive qualitative approach. According to Sugiyono (2019), qualitative research is a research method used to understand social or human phenomena by delving deeply into the meanings, views, and experiences of individuals. This research focuses on the natural context without intervention or manipulation from the researcher. This research emphasizes a deep understanding of phenomena rather than measuring variables. The data collected consists of words, images, or narratives, not numbers, and describes phenomena according to the context and situation that occurs.

RESULT AND DISCUSSION

1. Artificial Intelligence

Artificial Intelligence (AI) is a key concept, namely the ability of computer systems to perform tasks that typically require human intelligence, such as learning, understanding language, recognizing objects, and making decisions (Badmus et.al., 2024). Figure 1 is a diagram that maps various branches or categories within Artificial Intelligence (AI)



Source: Badmus, Oluwaseun & Rajput, Shahab & Williams, Mosope. (2024)

Figure 1: Broader AI Concept

The diagram in Figure 1 shows the relationship between various subfields of AI and how the technologies or approaches within them are interconnected. Machine Learning (ML) is a subset of AI that focuses on developing algorithms that enable systems to learn from data. At this stage, the AI model is trained using labelled data and attempts to find patterns in unlabelled data. One of the popular ones is Deep Learning. This is an ML approach using artificial neural networks with many layers. (deep neural networks).

Natural Language Processing (NLP) is a subset of AI that focuses on the interaction between computers and human language. In this branch, AI extracts important information from text (Content Extraction), categorizes text based on certain categories (Classification), translates text from one language to another (Machine Translation), answers questions based on existing data (Question Answering), and generates new text that resembles human language. (Text Generation).

Expert Systems are AI Systems that use a knowledge base to provide recommendations or decisions. Usually designed to solve specific problems with predetermined rules. While Vision is a subset of AI related to image or video processing, which includes Image Recognition, that is recognizing objects in images, and Machine Vision, which processes and analyses visual data for specific applications, such as robotics.

Speech is a subset of AI related to voice processing and has the ability to convert speech to text (Speech to Text) and convert text to speech (Text to Speech). The last part of the diagram is Robotics, which involves integrating AI to create robots that can interact with the physical environment and includes planning to solve problems and take actions based on the data obtained. Figure 1 also emphasizes the research previously conducted by Shankar, Siva & Subramanian, Vijayalakshmi & S P, Gayathri. (2021), where the main fields in AI encompass various aspects that support each other to mimic human cognitive abilities with a similar approach.

2. Disrupted Innovations

Disrupted innovation is a term first introduced by Clayton M. Christensen in 1997. Christensen explains that disruptive innovation is an innovation that creates new markets and new value, replacing previously dominant technologies, products, or services. This type of innovation often starts in small or underserved markets before evolving into a significant threat to the dominant players in the industry. This concept was discovered when Christensen analysed the history of innovation in various industries, including the hard disk, telecommunications, and transportation industries. He found that established companies often fail to adopt new technologies because they focus on the needs of their main customers, while disruptive innovations serve new or neglected markets

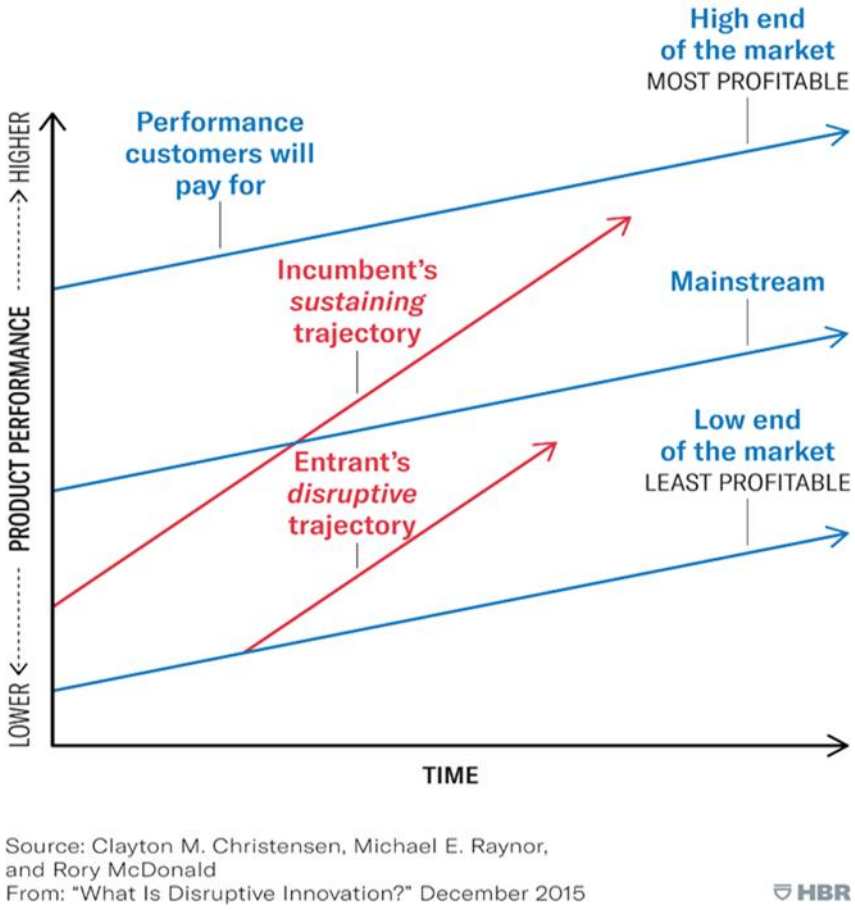


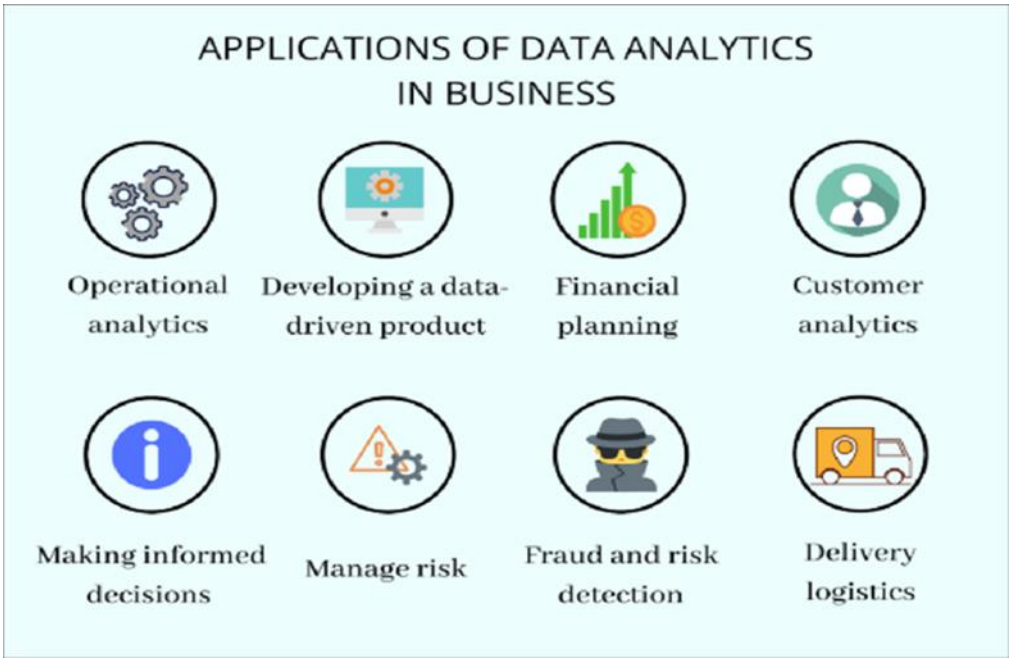
Figure 2: Disruptive Innovation Model

Figure 2 on the disruptive innovation model explains how new innovations can uniquely shake up established markets. The blue line (Customer Demand Trajectories) shows the level of performance or quality of the product desired by customers. Not all customers need highly sophisticated products; many customers are quite satisfied with simple products that meet their needs. The upper red line (Sustaining Trajectory) explains how large companies usually continue to improve the quality of their products to serve customers in the upper market segment, where the greatest profits can be obtained. However, they often focus too much on high-end customers, neglecting the needs of customers in the lower segment or general market.

The red underline (Disruptive Trajectory) shows how new companies (or newcomers) enter the market with simple, cheap, and sufficiently good products to meet the needs of customers in the lower segment (which are often neglected by large companies). From there, these new companies gradually improve the quality of their products and begin to challenge the major players in the upper market.

This model illustrates how disruptive innovation works by creating a gap in the lower market segments that are often overlooked by established players. New entrants use this strategy to gain an initial foothold, improve their offerings, and gradually ascend to more profitable markets, eventually challenging the dominance of established players. New entrants use disruptive innovation strategies to enter markets that are not very profitable for large companies. Then, they grow and start attracting more customers, including key customers, until they eventually displace the dominance of the major players in the market.

3. Competitiveness



Source: Badmus, Oluwaseun & Rajput, Shahab & Williams, Mosope. (2024)

Figure 3: Broader AI Usage

Figure 3 titled "Applications of Data Analytics in Business" explains various data analytics applications that use AI in business to support decision-making, improve operational efficiency, and provide deep insights. Here is the explanation of each element:

In Operational Analytics, AI is used to optimize the daily operational processes of a business. Its function is to assist in the analysis of data related to operations such as production, supply chain management, and resource management to improve efficiency and productivity. For Developing a Data-Driven Product, here AI is used to create products designed based on the analysis of customer data and market trends, which helps in understanding market needs and customer preferences so that the resulting products are more relevant and competitive.

In the field of Financial Planning, AI uses historical data to plan finances more effectively. The goal is to help businesses make more accurate budget, investment, and strategic financial planning decisions. In the field of Customer Analytics, AI is used for analysing customer data to understand their behaviour, preferences, and needs. The desired goal is to enhance the customer experience by providing personalized and relevant services. AI also helps management make more informed decisions based on insights from data analytics. This reduces uncertainty in strategic and operational decision-making.

In Manage Risk, AI identifies, assesses, and mitigates risks based on the available data. The goal is to help companies minimize potential losses due to identified risks. AI can detect suspicious or unusual activities to prevent fraud, where AI functions to protect the company from financial and reputational losses due to fraudulent activities. For Delivery Logistics, AI can optimize logistics processes and goods delivery using data. The goal is to improve efficiency in the supply chain and ensure that goods reach customers on time.

Every management decision displayed by the application in image 3 shows how AI works as data analytics can be used in various aspects of business to improve decision-making, operational efficiency, and customer satisfaction, while also reducing risks and preventing losses. By leveraging AI capabilities in data analytics, businesses can gain a competitive edge through more proactive and responsive strategies to changing market dynamics.

Artificial Intelligence (AI) has become a highly effective tool in database management and analysis. AI is capable of enhancing data processing efficiency across various sectors, such as banking, healthcare, and logistics. AI technologies, such as machine learning and deep learning, can help organizations extract valuable information from very large and complex data. (big data). With AI, companies can: identify hidden patterns within data, make faster and data-driven decisions, and enhance predictive capabilities, becoming more proactive in decision-making (Faris, B. A. et. al., 2024). The use of Big Data Analytics (BDA) combined with AI technology has brought significant transformation to the way companies manage and utilize data. Eka Mayasari and Agussalim (2023) explain that AI enables companies to understand customer needs more deeply through the analysis of vast amounts of customer data. BDA helps companies design more effective and data-driven business strategies. The combination of AI and BDA produces more accurate insights, which can be used for strategic decision-making.

Another study conducted by Gunawan et al. (2021) also supports this. The application of AI and Big Data Analytics (BDA) greatly supports the audit process, especially in terms of detecting potential risks in real-time, identifying anomalies or suspicious transactions in vast financial data, and enhancing the accuracy of financial statement analysis. AI helps auditors reduce reliance on time-consuming manual analysis. With sophisticated algorithms, auditors can analyze data more efficiently, reducing the likelihood of human error and providing more transparent and credible audit results.

CONCLUSIONS

1. The impact of the application of Artificial Intelligence on disruptive innovation.

Christensen (1997) explains that disruptive technologies, such as AI, often begin by serving small markets that are overlooked by major players. Although initially unappealing to large companies, AI gradually grew to fundamentally change the industry, replacing traditional methods that were no longer efficient. "AI is the new electricity," where AI is a technological revolution equivalent to the impact of electricity on human life in the past, and AI will disrupt various sectors by creating greater efficiency in various processes (Andrew Ng, 2016).

Kai-Fu Lee (2018) revealed that AI can disrupt the global market by creating significant efficiencies in sectors such as healthcare, finance, and transportation. He also warned about the potential inequalities that could be caused by AI if not managed wisely. AI not only replaces manual labor but also creates new job opportunities that leverage machines' ability to analyze data on a large scale. AI will create much higher productivity if applied correctly.

AI not only changes the way companies operate but also introduces new business models that are more efficient and customer-oriented. The application of AI in various sectors helps companies to continue innovating, face global challenges, and accelerate digital transformation.

According to Lament et al. (2020), Sustaining Innovation (SI) differs from Disruptive Innovation (DI). Sustaining Innovation aims to maintain the existing market development, focusing on improving products/services. Thus, SI is carried out to enhance the quality of existing products/services. Sustaining Innovation carries low risk because it only modifies or refines existing technology and involves gradual evolution of the existing system. Therefore, Sustaining Innovation is usually planned systematically. Sustaining Innovation: Its impact is predictable and mostly done to support stable growth. SI usually has low initial costs and its launch is quick and predictable. Meanwhile, DI sometimes shakes up the market or radically changes it by creating new categories of products or services. The goal is to improve services for specific customer groups. Disruptive Innovation creates new products or services that were previously unavailable, making Disruptive Innovation high-risk because it introduces entirely new technologies or markets. Disruptive Innovation causes a major revolution that profoundly alters market structures, making its impact difficult to predict, with the potential for extreme gains or losses. The initial costs of Disruptive Innovation are very high and take longer, depending on the complexity of the product/service. The similarity between DI and Si lies only in the market research required for both types of innovation.

Many companies use AI to automate repetitive and rule-based business processes, such as data processing, inventory management, performance management, and financial report management. This automation reduces reliance on manual labor, speeds up processes, and minimizes human errors. Performance Management is crucial for the oversight and planning of the organization (Umi Rusilowati dan Sora Baltasar, 2024). AI is capable of automatically collecting performance data and analysing it quickly using machine learning algorithms. (machine learning). The data can include productivity, efficiency, and employee engagement. AI is used in performance appraisal systems to provide data-driven analysis about employees. Disruptive technologies such as cloud computing and big data analytics enable companies to leverage data from various sources to measure performance in real-time, with the

benefits of eliminating bias in performance evaluations and providing more accurate and actionable insights. This aligns with the objectives of performance management administration, namely job evaluation for the purposes of compensation, promotion, and termination, as well as other matters (Umi Rusilowati dan Sora Baltasar, 2024).

The company uses AI to manage customer service through chatbots and virtual assistants capable of handling customer requests and inquiries in real-time. Chatbots can help enhance the customer experience by providing quick and relevant solutions. Tokopedia, as one of the largest e-commerce platforms in Indonesia, uses AI in various operational aspects, such as automating customer service with chatbots. Another example is in autonomous vehicles like Tesla, which use AI for navigation and decision-making.

AI is used to analyse big data and make predictions related to market trends, customer preferences, and product demand. For example, e-commerce companies can use AI to analyse customer purchasing behaviour and provide personalized product recommendations. Tokopedia and Bukalapak, two major e-commerce platforms in Indonesia, have also implemented AI to enhance customer experience. Both platforms use machine learning algorithms to provide product recommendations based on previous transaction data and customer preferences. Additionally, AI-based chatbots are used to provide 24/7 customer service, reducing reliance on human agents and increasing efficiency.

In the logistics and distribution sector, AI is used to plan delivery routes, predict product demand, and optimize inventory. By using AI in supply chain management, companies can reduce costs, avoid stock shortages, and improve distribution efficiency. Gojek and Grab use AI to plan delivery routes, optimize travel times, and calculate fares dynamically. AI enables these companies to provide faster and more efficient services, as well as reduce congestion in major cities. In logistics, AI helps predict demand and plan the distribution of goods more effectively. Enhanced Security and Fraud Detection, AI is used to enhance security systems and fraud detection, both in financial transactions and in the digital world. AI algorithms can identify suspicious patterns and alert companies to prevent greater losses. AI algorithms are used to detect fraud in the Financial sector, for example: MasterCard. Technology companies use AI to develop new products that were previously impossible to create. For example, Amazon uses AI for product recommendations, and in the automotive industry, companies like Tesla use AI to develop autonomous cars (Siri Tesla).

Companies use AI in marketing campaigns to analyse consumer behaviour and optimize advertisements based on individual preferences. AI enables more targeted marketing, increasing the ROI (return on investment) of advertising campaigns. Starbucks uses AI-based predictive analytics to analyse customer data from mobile apps, loyalty card transactions, and online interactions. This system studies customer purchasing patterns, product preferences, visit times, and geographical locations. AI allows consumers to search for products using images instead of keywords, for example, the visual search feature on Pinterest or Google Lens.

2. AI, Disruptive Innovation, And Operational Management

In the context of operational management, AI enables companies to operate more efficiently and effectively, creating faster and smarter processes. AI allows for the automation of various processes that were previously done manually, reducing operational costs, and increasing productivity. AI can be used to monitor and optimize

production flows, reduce resource waste, and identify areas for improvement. Similarly, in data-driven decision making. With AI's ability to analyse large amounts of data and uncover hidden patterns, companies can make more accurate and fact-based decisions. AI can assist in market analysis, trend prediction, and more accurate risk management.

Artificial Intelligence (AI) and disrupted innovation play a crucial role in the transformation of company operational management. AI, with its capabilities in processing big data, predictive analytics, and automation, significantly contributes to changing how business operations are conducted, introducing new approaches to optimize efficiency and reduce costs. Disrupted innovation refers to innovation that replaces or disrupts existing markets with new products or services that are more efficient and often more affordable, often originating from smaller players or companies that are not yet established.

AI is one of the main drivers of disruptive innovation because it can create new ways of providing products and services, replacing traditional business models, such as in Operational Efficiency. AI enables automation that reduces reliance on manual labour, such as the use of robots in manufacturing. This is in line with the research conducted by Larasati Pingkan Cahya Hernita. (2024). This research highlights the role of information technology, including Artificial Intelligence (AI), in business transformation in the digital era. AI drives product and service innovation, enhances operational efficiency, and strengthens the competitiveness of companies. However, the adoption of AI also presents challenges, such as the need for new skills and changes in organizational structure. Companies need to effectively manage the disruptive impact of IT to remain competitive in the ever-evolving market.

Technologies like chatbots and AI-based personalization provide fast and relevant services, changing customer expectations towards business services. AI enables service personalization, enhancing customer satisfaction and loyalty. This is in line with the research conducted by Muhammad Asif Khan (2024) and Manggala I. et al., (2024), which states that the implementation of AI in digital marketing also helps companies understand customer needs more deeply and respond to market changes more quickly, researching the transformational impact of AI on traditional businesses in Indonesia.

AI enables businesses to enter previously inaccessible markets. Digital technology drives business transformation, enhances operational efficiency, and creates product and service innovations. However, the use of digital technology also brings disruptive impacts, forcing companies to adapt to changing business models and more intense competition. Artificial Intelligence (AI) acts as a catalyst in creating new products that are not only innovative but also have the potential to disrupt traditional markets, a concept known as disruptive innovation. AI enables companies to deeply understand customer needs through big data analysis, allowing for product personalization, improving the efficiency of development processes, and accelerating innovation through simulation and automated testing. This is in accordance with the research conducted by Suhardjanto et al. (2021) and Alfia Utami et al. (2023)

According to Suhardjanto et al. (2021), product innovation involves the digitalization of services and collaboration that relies on peer-to-peer platforms. (P2P). The digitization of these products enables faster, more efficient, and more flexible access to financial services compared to traditional methods. The financial industry uses Artificial Intelligence (AI) technology to personalize services, analyse customer behavior patterns, and enhance the customer experience. Additionally, big data analysis helps banks develop products that meet the specific needs of customers. The implementation

of AI provides a competitive advantage to companies by enhancing the appeal and effectiveness of the products offered

3. AI Challenges and Opportunities.

There are several challenges that need to be considered in AI implementation:

1. Dependence on High-Quality Data. AI relies on large and high-quality data to train models. If the data used is incomplete or unrepresentative, the results produced by AI can be inaccurate or biased. This can lead to errors in decision-making, especially in important cases such as credit assessments or medical diagnoses. Therefore, it can be concluded that for Indonesia, scattered and unstructured data poses a significant obstacle to the effective implementation of AI (Kurniawan et al., 2018).
2. High Implementation Costs. The initial investment for AI technology is considered high, making it difficult for small and medium-sized enterprises to access. (Helo & Hao, 2021). Developing and implementing advanced AI solutions requires significant costs, including software development, staff training, and adequate technical infrastructure. Many small and medium-sized enterprises may struggle to access or implement AI due to cost reasons. Companies must invest in technology and change their work culture to adopt new business models that align with the digital era.
3. Difficulty in Integrating with Legacy Systems. The lack of adequate technological infrastructure in Indonesia, especially in terms of integrating AI into operational systems. (Kurniawan et al., 2018). Many companies have legacy systems and infrastructure that are difficult to integrate with new AI technology. This requires additional costs and time to transition and ensure that AI can function well alongside the existing systems.
4. Digital Divide. The disparity in access to AI technology among various regions in Indonesia slows down digital transformation (Santoso et al., 2024).
5. Resistance to Change. Many industry players are still reluctant to adopt new technology due to a lack of understanding or fear among their workers of losing their jobs (One of the main concerns related to AI is the potential loss of jobs due to automation). AI can replace routine jobs that were previously performed by humans, especially in the fields of manufacturing, customer service, and data processing (Kurniawan et al., 2018).
6. Limitations in Creativity. Although AI can handle analytical and data-based tasks, AI is still limited in terms of human creativity and intuition. AI cannot fully replace the human role in tasks that require creativity, empathy, and complex strategic thinking. The limitation of the workforce that understands the application of AI in operations management and supply chain (Helo & Hao, 2021).
7. Ethical and Security Issues. The unethical use of AI, such as misuse in decision-making, can lead to legal and reputational problems. (Helo & Hao, 2021). Additionally, AI is also vulnerable to cyber-attacks and technological misuse that can cause significant losses to companies and society (Santoso et al., 2024).
8. Regulatory Uncertainty. In Santoso et al. (2024) and Kurniawan et al. (2018), it is clearly stated that there is currently no clear regulation to govern the responsible development and use of AI in Indonesia.

Indonesia, as a country with a large population and a continuously developing economy, has many opportunities to leverage AI and disruptive innovation. This

technology can support transformation in various sectors, drive efficiency, enhance inclusion, and create competitive advantages. AI and disruptive innovations can help various industries in Indonesia transform the way they work.

1. AI technologies such as machine learning and predictive analytics can improve the efficiency of production processes, reduce waste, and enhance product quality. In the agricultural industry, AI technology can be used for precision farming, such as predicting weather, managing irrigation, or analysing plant health. Disruptive innovations in this sector have the potential to increase the productivity of small farmers. AI can also help optimize the use of renewable energy, such as solar and wind power, and improve the efficiency of electrical grids.
2. Another opportunity that can be obtained is in the Digitalization of Public Services. AI plays a crucial role in creating more efficient and inclusive public services. In healthcare, AI can be used to diagnose diseases faster, provide more accurate treatment recommendations, and improve access to healthcare services, especially in remote areas. AI can also enable intelligent transportation systems, such as autonomous vehicles or route optimization to reduce traffic congestion. AI can enhance the tourist experience through service personalization, tourism trend prediction, and destination management optimization.
3. AI-based technology, such as adaptive learning systems, enables personalized learning for students. Disruptive innovations like e-learning platforms have opened access to education in remote areas of Indonesia.
4. Indonesia is one of the largest digital economy markets in Southeast Asia. AI and disruptive innovations are accelerating this development. AI can be used to recommend products, optimize logistics, and enhance customer experience. Technologies like chatbots have already become disruptive innovations that change the way consumers interact with companies.
5. In the Financial Industry, AI enables innovations such as robo-advisors, fraud detection systems, and big data-based credit analysis. This enhances financial inclusion in Indonesia.
6. AI and disruptive innovations can help bridge the socio-economic gap in Indonesia, such as by accelerating Technology Accessibility: Innovations like AI-based applications for local language translation or voice recognition technology can enhance access for communities in remote areas.
7. AI can be used to help Micro, Small, and Medium Enterprises (MSMEs) compete with larger players through data-based solutions such as demand forecasting or AI-based marketing strategies.

AI and disruptive innovation enable Indonesian companies to compete in the global market. By leveraging AI, companies can reduce operational costs, increase efficiency, and offer more competitive products or services. Companies can create new AI-based products or services that meet market needs, such as AI recommendation-based streaming platforms or smart home devices. AI and disruptive innovation offer great opportunities to enhance efficiency, inclusion, and Indonesia's competitiveness across various sectors. By addressing infrastructure, regulatory, and skill challenges, Indonesia can leverage this technology to drive economic growth and create competitive advantages, both locally and globally.

Collaboration between the government, private sector, and society is crucial to ensure the effective, inclusive, and positively impactful implementation of Artificial

Intelligence (AI). The government plays the role of policymaker and regulator to create a framework that supports AI development. Clear and adaptive regulations are needed to ensure the ethical, safe, and lawful use of AI, including protecting data privacy and addressing potential algorithmic bias. Additionally, the government needs to invest in digital infrastructure such as high-speed internet networks, data canters, and cybersecurity to support AI adoption across various sectors.

The private sector plays a key role in developing AI-based applications and solutions. Companies have the resources to conduct research and development, integrate AI technology into business processes, and create innovative products that meet market needs. Private investment can also accelerate the adoption of AI in various sectors, including healthcare, education, manufacturing, and finance. The public needs to be empowered to understand and use AI technology wisely. Digital literacy is key for society to harness the benefits of AI without fearing negative impacts such as job loss due to automation. Community involvement in the implementation process is also important to ensure that the AI solutions developed are relevant and meet local needs.

Close collaboration creates an ecosystem that supports sustainable AI-based innovation. The government can provide incentives for companies to innovate, while society becomes critical and active end-users in providing feedback for technological improvements. With harmonious collaboration, AI can become a key driver of digital transformation, economic growth, and widespread improvement in quality of life, without leaving any particular social group behind.

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