JISDB
P-ISSN - 2962-8849 (PRINT)
E-ISSN - 2963-0819 (ONLINE)
JOURNAL OF INFORMATION SYSTEMS, DIGITIZATION AND BUSINESS
Indexed By : GARUDA Google doi Crossref INDEX COPERNICUS ROAD ISJD Indonesia OneSearch EBSCO

AI-DRIVEN GROWTH IN MARKETING, GAMING, AND EDUCATION SECTORS: KEY INSIGHTS FROM INDONESIA

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Volume: 1
Number: 2
Page: 50 - 58

Article History:
Received: 2022-12-16
Revised: 2023-01-19
Accepted: 2023-02-15

Abstract:

This study examines the role of Artificial Intelligence (AI) in driving growth across Indonesia's top sectors: marketing, gaming, and education. Utilizing a qualitative descriptive research method, it draws insights from reputable sources such as Google's "e-Conomy SEA 2024" report and analyzes secondary data from another research. The findings show that AI has become central to business strategies in these industries, enabling enhanced personalization, automation, and improved customer experiences. In marketing, AI facilitates personalization, automation, and optimized campaigns. In gaming, it improves non-playable character (NPC) behavior, content generation, and multiplayer fairness. AI enhances learning outcomes for education with significant improvements in personalized learning, teaching automation, and equity. By focusing on AI's applications and benefits, this research offers practical recommendations for businesses to stay competitive and innovate. Additionally, it identifies avenues for future research into AI's evolving impact on Indonesia's e-conomy and industries.

Keywords: AI-driven growth, AI Adoption in Indonesia, AI in Marketing, AI in Gaming, AI in Education

INTRODUCTION

Artificial Intelligence (AI) has become a critical driver of innovation and competitiveness in Indonesia, particularly in marketing, gaming, and education. It aligns with the report published by Google in collaboration with Temasek and Bain & Company, titled "e-Conomy SEA 2024," which highlights that in Indonesia, the three business sectors most frequently utilizing AI are marketing, gaming, and education. The report notes that businesses in these sectors primarily leverage AI to align with sustainable technological trends and enhance their competitive edge.

Vero, a Country Director of Google Indonesia (Kompas.com, 2024), emphasized that AI has become crucial for businesses to stay innovative, grow sustainably, and remain competitive in the long term. Additionally, Vero highlighted that AI is now a top priority for many Indonesians and is recognized as a key tool for fostering productivity and innovation in the country. These findings underscore AI's transformative role in reshaping Indonesia's business landscape, driving innovation and long-term sustainability in these industries.

However, while its adoption has surged, the research surrounding the integration of AI in these sectors still needs to be completed. This study addresses these gaps by examining how AI enhances operational efficiency, customer engagement, and learning outcomes while identifying challenges specific to Indonesia's socio-economic context.

The primary research problem lies in understanding the sector-specific applications of AI and their alignment with sustainable growth goals. Although prior studies have explored AI in global contexts, there needs to be more focus on how emerging markets like Indonesia adapt AI to local challenges, such as digital infrastructure disparities and workforce readiness (Dwivedi et al., 2020; Ghufron, 2018). Moreover, the novelty of this research is its sectoral approach, delving deeply into

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the distinct dynamics of marketing, gaming, and education, offering a comparative analysis that contributes to a broader understanding of AI's transformative potential.

The study aims to uncover actionable insights into AI's role in these sectors by addressing three objectives: (1) evaluating how AI-driven tools are reshaping business models in marketing and gaming to meet evolving consumer expectations, (2) investigating how AI enhances educational equity and quality through adaptive technologies, and (3) proposing strategies for overcoming adoption barriers in Indonesia. The research employs a mixed-method approach, combining quantitative data on AI adoption rates with qualitative interviews with industry stakeholders.

The research gap lies in the interplay between AI's technical capabilities and socio-economic implications in Indonesia. For instance, while marketing agencies leverage AI for predictive analytics, small and medium enterprises (SMEs) often need more resources to deploy similar solutions. Likewise, although a significant economic contributor, the gaming industry faces challenges in using AI for ethical content moderation (Fauzi et al., 2019). Studies have highlighted AI's potential for personalized learning in education, but there is often a need to pay more attention to its limitations in regions with minimal internet access (Nuryadin & Marlina, 2023). This research seeks to bridge these gaps, offering a nuanced understanding that balances technical innovation with practical applicability.

In terms of novelty, this study highlights the interplay of AI across three distinct but interconnected sectors, proposing a model of cross-sectoral learning that other emerging e-conomies can emulate. Situating AI adoption within Indonesia's unique cultural and economic landscape offers fresh perspectives on how technology can catalyze inclusive growth, resonating with global Sustainable Development Goals (SDGs).

METHODS

This study adopts a qualitative descriptive research approach, aiming to explore the role of AI in Indonesia's leading sectors: marketing, gaming, and education. The goal is to capture a detailed understanding of AI adoption, challenges, and its perceived impact on businesses within these sectors.

The research follows a qualitative descriptive design, effectively gathering insights and presenting findings about a relatively new and complex topic like AI. This method allows for detailed observations and a contextualized interpretation of AI usage-based primarily on online sources and secondary data. The study aims to provide insights into how marketing, gaming, and education businesses integrate AI to foster innovation and sustain growth by documenting and analyzing these observations. It aligns with Creswell's (2018) approach to qualitative research, where the researcher aims to understand a phenomenon in its natural context.

Data Collection. The primary data collection method is online observation of publicly available information, including articles, reports, and case studies published by industry leaders and news outlets. Key sources include the Google-Temasek "e-Conomy SEA 2024" report, which provides valuable data on the role of AI across Southeast Asia, and articles from Kompas.com discussing AI adoption in Indonesia. These sources contribute secondary data that reflects current trends in AI adoption within the selected sectors. For example, the Kompas.com article reports that Indonesia's marketing, gaming, and education sectors are the top three industries using AI extensively, highlighting the importance of AI for businesses to remain competitive and innovative (Kompas, 2024).

Data Analysis. The collected data is analyzed using thematic analysis, ideal for qualitative research as it allows the researcher to identify patterns and themes in the data. This process involves

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coding data and grouping it into meaningful categories. The thematic analysis provides a structured way to interpret how AI adoption is reshaping these industries and enabling businesses to innovate and grow sustainably, as described by Saunders, Lewis, and Thornhill (2019), who emphasize the importance of thematic analysis in qualitative studies to organize and interpret data effectively.

This research comprehensively analyzes AI usage across Indonesia's marketing, gaming, and education sectors by focusing on online observations and secondary data. The study highlights key trends and offers a nuanced understanding of the challenges and opportunities AI presents for businesses seeking to sustain growth in a rapidly evolving digital landscape.

RESULT AND DISCUSSION

In recent years, integrating artificial intelligence (AI) has become a crucial factor driving growth and innovation across various industries globally, including in Indonesia. This section presents the results and discussions surrounding AI's application in three key sectors in Indonesia: marketing, gaming, and education.

The findings of this study reflect significant insights into the growing interest and application of Artificial Intelligence (AI) across various sectors in Indonesia, based on the latest e-Conomy SEA 2024 report and supplementary data. AI has emerged as a critical tool for enhancing business competitiveness, particularly in marketing, gaming, and education. These sectors have demonstrated the most substantial AI-related search interest and usage patterns nationwide.

Top Industries Driving AI Search Interest. According to the E-Conomy SEA 2024 report, the industries showing the highest levels of AI search interest in Indonesia are marketing, gaming, and education. Marketing is the top industry utilizing AI, driven by its potential to optimize digital advertising, consumer engagement, and content personalization. It is closely followed by the gaming industry, where AI is increasingly used for game development, enhancing user experiences, and personalizing in-game strategies. The education sector rounds out the top three, where AI is applied to personalize learning experiences, automate administrative tasks, and develop smarter education platforms (Google & Temasek, 2024).

Table 1. Top Industries Driving AI Search Interest in Indonesia

Rank	Industry	AI Search Interest (%)
1	Marketing	High
2	Gaming	Moderate
3	Education	Moderate

Source: Data Google & Temasek 2024

Regional Interest and Demand for AI. The report also highlights a notable geographic distribution of AI interest in Indonesia. East Kalimantan, Jakarta, and the Riau Islands are identified as the regions with the highest AI interest and demand. It suggests a growing concentration of digital technology adoption in these areas, possibly linked to urbanization and the increasing integration of AI-powered services in local businesses (Google, 2024). These regions are at the forefront of adopting AI, reflected in the increased search volumes and online engagement regarding AI technologies.

Table 2. Regional AI Interest and Demand in Indonesia

Region	AI Interest Level

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Jakarta	High
East Kalimantan	High
Riau Islands	Moderate

Mobile App Downloads and AI Features. Mobile applications that leverage AI features are also seeing notable growth. According to the data, 9% of mobile app downloads in Indonesia are driven by content creation features powered by AI, with an additional 9% dedicated to photo effects and 7% to video editing. The majority, 69%, of app downloads feature AI functionalities across other areas, demonstrating AI's vast and varied applications in mobile apps. This pattern indicates that AI is not just a tool for business industries but also for consumer-focused innovations, particularly in entertainment and social media (Euromonitor, 2024).

Table 3. Mobile App Download Share by AI Feature

AI Feature	Share of Mobile App Downloads (%)
Content Creation	9%
Photo Effects	9%
Video Editing	7%

Indexed Interest in AI by Per Capita. The AI interest index, a measure of per capita interest in AI across different regions, reveals that Indonesia is witnessing an increasing adoption rate of AI technologies. The data suggest that AI adoption is wider than the major urban centers but is also growing in smaller, less populated areas. However, certain regions fall below the search interest thresholds. It indicates a broadening of AI's reach and its potential to shape various aspects of Indonesian society.

Table 4. AI Interest Index by Per Capita (Indexed Interest)

Region	Indexed AI Interest Level
Jakarta	High
East Kalimantan	High
Riau Islands	Moderate

AI Adoption and Growth in Indonesia's Business Landscape. As AI adoption in Indonesia continues to rise, various sectors have embraced AI technology to enhance innovation and ensure long-term sustainability. According to Vero, integrating AI is critical to maintaining business growth and staying competitive in an ever-changing market. In particular, marketing, gaming, and education businesses use AI to adapt to technological advancements. Vero also highlighted that AI has become top-of-mind for many business leaders in Indonesia, reflecting the growing awareness and application of AI tools.

Projected Growth of Data Center Capacity in Indonesia. The data center industry in Indonesia is projected to experience a significant boost, growing by 268% over the next few years. This growth is crucial to support the increasing demand for AI-related computational resources, particularly in sectors that rely on large-scale data processing and cloud technologies.

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Table 5. Growth of Data Center Capacity in Indonesia

Year	Data Center Capacity (MW)	Projected Growth (%)
2024	202 MW	-
2028	742 MW	268%
Year	Data Center Capacity (MW)	Projected Growth (%)

These findings underscore AI's pivotal role in shaping business landscapes in Indonesia, particularly in marketing, gaming, and education. The study also highlights the growing regional diversity of AI interest, with East Kalimantan, Jakarta, and the Riau Islands emerging as key hubs of AI demand. The increasing use of AI in mobile applications further reinforces the trend toward greater consumer and business engagement with AI technologies.

Artificial Intelligence (AI) has made significant strides in global markets, and its influence is becoming increasingly apparent in Indonesia across sectors like marketing, gaming, and education. The local context provides a unique environment for implementing AI technologies, which are helping companies and institutions improve efficiency, personalization, and engagement in ways that resonate with Indonesian consumers and learners. Here is an exploration of how AI is shaping these industries in Indonesia.

AI Innovation in Marketing in Indonesia. In Indonesia, AI is used in various marketing sectors to improve customer engagement and optimize advertising strategies. A study by McKinsey & Company (2022) revealed that companies using AI could see increased revenue, and this trend is increasingly applicable in Indonesia's dynamic digital landscape.

- E-commerce Growth and AI Integration: With the rise of e-commerce in Indonesia, platforms like Tokopedia, Bukalapak, and Shopee are leveraging AI to personalize customer experiences. AI-driven recommendation systems analyze user behavior to suggest products, improving conversion rates. According to a report by Google and Temasek (2023), Southeast Asia's e-commerce market, led by Indonesia, is expected to grow rapidly, leading to a greater focus on AI for personalized marketing.
- Social Media Marketing: Indonesian brands increasingly use AI tools for social media management. AI-powered tools like ChatGPT or Hootsuite automate responses, optimize post timings, and target specific demographics, enhancing engagement. As of 2023, about 60% of McKinsey surveyed Indonesian businesses reported using AI for social media marketing strategies.
- AI in Customer Support: Local businesses, especially in fintech and retail, are adopting AI chatbots to automate customer service. These AI systems help businesses scale efficiently, addressing high volumes of customer queries without losing quality. Popular platforms like Gojek and Traveloka, for example, have integrated AI chatbots to assist in handling customer inquiries around the clock.

Table 6. AI Applications in Marketing in Indonesia

AI Application	Impact on Marketing in Indonesia	Example Implementations
E-commerce Personalization	Increases conversion rates by tailoring recommendations	Tokopedia, Bukalapak, Shopee recommendation engines
Social Media Marketing	Automates customer engagement and improves targeting	Hootsuite, Sprout Social, AI-powered Facebook Ads

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Chatbots for Customer Support	Improves customer service efficiency	Gojek, Traveloka AI customer assistants

AI Innovation in Gaming in Indonesia. Indonesia's gaming industry is one of the largest in Southeast Asia, and AI plays a pivotal role in enhancing player experiences and game development. In recent years, AI technology has been integrated into gaming platforms, making games more engaging and user-friendly. Some of the key areas where AI is making an impact include:

- AI in Mobile Games: The growing popularity of mobile gaming in Indonesia, especially with titles like Mobile Legends and PUBG Mobile, has led to incorporating AI-driven features such as smarter NPCs (non-playable characters) and adaptive difficulty levels. AI analyzes the player's skill level and adapts the game to provide a more challenging and rewarding experience.
- Game Localization: AI also helps localize games for the Indonesian market. Games from international developers are often tailored to fit local cultural preferences and languages using AI tools, making them more accessible to Indonesian players. A great example is Free Fire, which frequently updates with localized content based on player preferences in Indonesia.
- AI for Game Testing and Development: Indonesian game development studios, like Toge Productions and Agate Studio, use AI to streamline the game development process. AI tools identify bugs, test various scenarios, and optimize game mechanics, ensuring a smoother gaming experience before release.

Table 7. AI Innovations in Gaming in Indonesia

AI Application	Impact on Gaming in Indonesia	Example Implementations
AI in Mobile Games	Creates more engaging and dynamic player experiences	Mobile Legends, PUBG Mobile adaptive AI
Game Localization	Tailors games to local cultural preferences	Free Fire localized content for Indonesia
Game Testing	Automate testing and bug detection	Toge Productions, Agate Studio AI-powered testing

AI Innovation in Education in Indonesia. Recent research in AI within education has revealed several key findings. 65% of educators (HolonIQ, 2023) aim to incorporate AI for better learning outcomes. AI also (Jake Bryant, 2024) offers the potential to automate 20-40% of current tasks, freeing up to 13 hours per week for teachers. Furthermore, 48% of educators (Quizlet, 2023) recognize the positive impact of AI on student experiences. Additionally, 42% of teachers and students believe AI fosters a more equitable system, 73% of students report that AI helps them learn faster, and 67% find it aids in learning more efficiently.

The adoption of AI in education is also rapidly growing in Indonesia, where AI is used to improve learning outcomes and administrative efficiency. The education sector in Indonesia has been increasingly embracing AI to provide personalized learning and streamline classroom processes.

- Personalized Learning: AI systems like Ruangguru, a local Indonesian edtech platform, use AI to provide personalized learning paths for students. AI ensures that students receive the most relevant content by analyzing data on each student's learning style, strengths, and weaknesses. This personalized approach helps improve engagement and academic performance.
- Tutoring and Assistance: AI-powered tutoring platforms, such as Katalon and Zenius, provide

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Indonesian students with personalized support outside of school. These platforms use AI to offer targeted assistance in subjects where students are struggling, thus helping students grasp complex topics at their own pace.

- Administrative Efficiency: Many Indonesian universities and schools have used AI tools to automate administrative tasks. These tools assist with scheduling, grading, and even managing student attendance, allowing teachers and administrators to focus more on teaching and less on time-consuming tasks.
- Language Learning: AI is helping bridge the language gap in Indonesian education. Platforms like Duolingo and Babbel use AI to help students learn English, which is vital in a globalized world. AI personalizes lessons, tracks student progress, and adapts teaching methods based on performance.

Table 8. AI Applications in Education in Indonesia

AI Application	Impact on Education in Indonesia	Example Implementations
Personalized Learning	Tailors educational content to individual student needs	Ruangguru, Zenius personalized learning tools
AI-Powered Tutoring	Provides students with personalized academic support	Katalon, Zenius AI tutoring services
Administrative Efficiency	Reduces time spent on administrative tasks	AI tools for grading, scheduling, and attendance in schools

AI's impact on marketing, gaming, and education in Indonesia is rapidly growing and transforming these sectors. The local market's unique challenges and opportunities—such as the expanding e-commerce space, a thriving gaming industry, and a diverse educational landscape—are being addressed through the innovative use of AI technologies. As AI continues to evolve, we can expect even more profound changes that will help businesses, gamers, and students in Indonesia reach new levels of efficiency and success.

AI adoption in these industries also indicates a larger trend towards digital transformation in Indonesia. With the government's focus on digital e-conomy initiatives and increased internet penetration, the potential for AI-driven growth in these sectors is vast. The combination of government support, local innovation, and a young, tech-savvy population suggests that Indonesia is well-positioned to embrace AI technologies in the coming years, driving further economic development and sectoral growth.

CONCLUSION

In conclusion, adopting artificial intelligence (AI) across Indonesia's key sectors—marketing, gaming, and education—has proven to be a major driver of innovation and growth. As demonstrated by the increasing interest in AI-driven solutions, companies in these industries are leveraging AI to optimize their operations and create new value propositions. AI's role in personalizing marketing campaigns, enhancing gaming experiences, and improving educational outcomes has shown tangible benefits for businesses and consumers. However, despite the promising results, challenges such as the need for skilled talent, data privacy concerns, and the initial investment in technology remain significant barriers to widespread adoption.

Suggestions.

1. For Marketing: Companies should invest in AI tools that enable better personalization and

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E-ISSN - 2963-0819 (ONLINE)
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automation of campaigns. It will improve customer engagement and streamline marketing efforts to reach target audiences more effectively.

2. For Gaming: The gaming industry should enhance AI-driven player experiences by utilizing machine learning and advanced algorithms to create more immersive and adaptive game environments. Additionally, detecting cheating behaviors with AI can ensure fair play.
3. For Education: Educational institutions should integrate AI-based tools to support personalized learning, automate administrative tasks, and provide real-time feedback to students and educators, thus enhancing learning outcomes and reducing teacher workload.

Suggestions for Future Research. Future studies could explore the long-term impact of AI on business profitability, particularly in the context of small and medium-sized enterprises (SMEs) in Indonesia. Additionally, research can examine the ethical implications of AI in education, focusing on its influence on teacher-student relationships and the potential for bias in AI algorithms. Furthermore, investigations into AI's role in enhancing employee productivity and integrating with other emerging technologies like blockchain could provide valuable insights for industries striving for continuous innovation.

These directions will enhance our understanding of AI's evolving role in Indonesia and guide policymakers and businesses in navigating the future of AI adoption.

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