

REVIEW ARTICLE

The Application of Artificial Intelligence Technology Innovation in Tourism

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Received: 15 March 2025 / Revised: 18 April 2025 / Accepted: 19 April 2025

Abstract: Artificial intelligence (AI) technology innovation in tourism plays a crucial role in enhancing competitiveness and introducing new challenges to the tourism industry. The application of AI technology innovation has been continuously increasing both in Thailand and globally across various areas, including strategic planning, office management, intelligent business systems, product development, marketing, and business expansion. Internationally, governments have adopted AI technology innovation to formulate policies and collect data. For instance, the Georgian National Tourism Administration utilizes AI to detect and analyze travelers' emotions through social media. Meanwhile, businesses focus on leveraging AI to improve service efficiency and analyze tourist behaviors. Examples include Disneyland, which employs AI to manage visitor flow, and Expedia, which integrates AI-powered travel planning tools through ChatGPT in its application. In Thailand, the adoption of AI technology innovation in tourism enhances problem-solving capabilities and introduces new opportunities in the industry. For example, the development of TAGTHAi serves as a digital concierge platform to facilitate tourism and includes the "Design My Trip" feature. Additionally, the National Digital Tourism Platform, Data Bank, and Token (Thailand CONNEX) leverages digital technology and innovation to enhance the competitiveness of tourism businesses. Many enterprises have developed applications to assist travelers, such as Siam AI Corporation's Tourism LLMs, which is an AI system built on OpenThaiGPT, and Gother, a comprehensive tourism platform offering centralized financial transactions. However, several critical factors must be considered, including the displacement of human labor in certain occupations, data privacy and security concerns, and the potential misuse of AI technology, such as spreading false information, which could lead to social issues and economic losses.

Keywords: Technology Innovation, Artificial Intelligence, Tourism

1. Introduction

Technology innovation plays a crucial role in society by addressing user needs, achieving goals, and solving problems. It supports organizational, industrial, economic, and social transformation, enhancing the competitive advantage of businesses and nations while driving overall human progress (Arthur, 2009; Coccia, 2019a; Dosi, 1988; Sahal, 1981). Today, technological innovations are becoming increasingly diverse, including the Internet of Things (IoT), 5G technology, and biotechnology. In particular, Artificial Intelligence (AI) technology innovation has been widely adopted across both public and private sectors. AI technology innovation involves the creation of intelligent machines that exhibit cognitive abilities similar to humans, particularly Machine Learning (ML), which enables computers or machines to autonomously learn, understand data relationships, and generate responses based on input and output data.

The overall benefits of applying AI technology innovation include improving efficiency and productivity, fostering innovation and new opportunities, enhancing quality of life, supporting better decision-making, and driving economic and social transformation. AI contributes to economic growth and creates new business opportunities. Both government agencies and businesses utilize AI technology innovation for public administration and service delivery. Businesses, in particular, emphasize AI adoption for office automation,

proactive management, and big data analysis to enhance operations.

In Thailand's tourism sector, AI technology innovation has significantly enhanced problem-solving capabilities and introduced new challenges within the industry. The adoption of AI in various tourism-related applications is widespread (OECD, 2024), improving visitor experiences through more interactive and personalized engagements, seamless travel processes, and 24/7 responsive services tailored to individual needs.

Furthermore, insights from SiteMinder's Changing Traveller Report 2025 (SiteMinder, 2025) indicate that Thai travelers are increasingly integrating technology and work flexibility into their leisure activities. The report highlights an impressive 98 percent adoption rate of AI for planning, booking, and enjoying accommodations. In addition, the growing trend of "workations," in which travelers combine work and leisure during the same trip, positions Thailand as a global leader in blending leisure, work, and digital tools within the travel experience.

This article explores the following key areas: the definition and types of innovation, the significance and meaning of AI technology innovation, AI applications in tourism both domestically and internationally, and the roles of government and business sectors. The insights provided aim to inform policy planning, strategy development, and practical applications of AI technology innovation to advance tourism services in the future.

2. Definition and Types of Innovation

Innovation is an advancement built upon existing inventions, making them accessible and accepted in the market, either as new products or novel processes that are developed and applied for the first time, generating economic benefits (Utterback, 2004). Innovation plays a crucial role in enhancing competitiveness

and improving the quality of life for people in a country. Over the years, Thailand has integrated and applied innovation across various sectors, including industries, businesses, and diverse purposes. This progress is driven by collaborative efforts between the public and private sectors, fostering innovation through various initiatives and contributing to an innovation-driven economy that enhances overall quality of life.

Types of Innovation

Innovation can be classified into multiple categories based on its scope and intended application:

2.1 The Four Types of Innovation (4Ps' Innovation)

According to Tidd and Bessant (2013), innovation can be categorized into four types:

1) Product Innovation – The transformation of goods or services through two key variables (Mingkwon Boonrod, 2018):

- Technological opportunities-Scientific and technological knowledge, tools, equipment, and processes that enable product development.
- Market demand-Consumer needs for new products and their willingness to adopt them, leading to economic or social benefits for the innovator.

2) Process Innovation-The modification of organizational methods for creating and delivering products or services.

3) Position Innovation-The transformation of how a product or service is presented or introduced within a new environment.

4) Paradigm Innovation -The fundamental shift in organizational culture or business models, altering mental frameworks and approaches to operations.

2.2 The Ten Types of Innovation Framework

The Ten Types of Innovation framework by Keeley, Walters, and Pikkell (2013) outlines different dimensions of innovation:

1) Configuration Innovation (How the business is structured and operates)

- Profit Model-Developing new business models to increase revenue, optimize pricing strategies, or enhance value perception.
- Network-Creating value through partnerships, collaborations, and strategic alliances, such as working with third parties, vendors, or industry clusters.
- Structure-Redesigning organizational structures, talent management, and decision-making processes.
- Process-Innovating manufacturing, service, or operational processes to improve efficiency and effectiveness.

2) Offering Innovation (Enhancing products and services)

- Product Performance-Improving the performance, features, or differentiation of products and services.
- Product System - Enhancing products through integration, complementary services, or additional functionalities.

3) Experience Innovation (Enhancing customer engagement and brand perception)

- Service-Creating customer-centric service innovations tailored to target audiences.
- Channel-Developing new distribution or communication channels to enhance product/service accessibility.
- Brand-Strengthening brand identity and recognition to enhance value perception.
- Customer Experience-Innovating ways to interact with customers, ensuring memorable brand or service experiences.

2.3 Classification by Area of Impact

Innovation can also be categorized based on its impact into Technological Innovation and Administrative Innovation (Gopalakrishnan & Damanpour, 1997; Smith, 2006; Bessant & Tidd, 2007; Schilling, 2008):

With the definition of technology innovation provided in various research studies, including:

1) Technological Innovation is based on complex technological systems that leverage advancements to address critical challenges, create opportunities, and improve efficiency (Coccia, 2019a, 2019b, 2020c). It encompasses:

- Incremental innovation - Gradual improvements to existing products or processes.
- Radical innovation - Transformative changes in products or services to meet emerging societal needs.
- Technological systems-Interconnected innovations contributing to economic and technical advancements.
- Technological revolutions-Disruptive changes redefining industries and economies.

2) Administrative Innovation focuses on organizational and managerial transformations, optimizing structures, policies, and decision-making frameworks to enhance operational efficiency.

Another perspective on technological innovation (IdeaScale, 2023) defines it as the creation and implementation of new or improved technologies, tools, systems, and processes that drive significant advancements across industries. This involves leveraging knowledge, expertise, and resources to develop solutions that enhance problem-solving, efficiency, progress, and value delivery.

In summary, technological innovation primarily involves the application of hardware, software, or technological processes that result in

significant advancements. It serves as a foundation for creating new value by enhancing efficiency, reducing costs, and improving user experiences.

3. The Significance and Definition of Artificial Intelligence Technology Innovation

3.1 Definition and Functionality

Artificial Intelligence (AI) technology refers to the development of machines with human-like intelligence and cognitive abilities, including human-like reasoning, action, rational thinking, and rational decision-making (Digital Economy Promotion Agency, 2025). AI primarily relies on Machine Learning (ML), which enables computers or machines to autonomously learn, understand data relationships, and generate output responses without requiring explicit programming or continuous manual input. This process integrates advanced mathematics, statistical modeling, data management, and programming expertise. Thus, ML serves as a fundamental cognitive system within AI, allowing it to distinguish, process, and respond to diverse datasets.

Another definition of AI (Huawei Technologies, 2021) describes it as a new field of scientific and technological innovation focused on studying and developing theories, methodologies, technologies, and application systems to simulate, enhance, and extend human cognitive abilities. AI is designed to enable machines to reason, analyze, and process information similarly to human cognition.

The three primary types of Machine Learning algorithms include:

- **Supervised Learning** – The model learns from labeled datasets containing clearly defined input-output relationships to generate predictive models based on historical data.

- **Unsupervised Learning** – The model analyzes unstructured and unlabeled datasets, identifying patterns and relationships without predefined classifications.
- **Reinforcement Learning** – The model learns through trial and error, optimizing decision-making based on environmental interactions and reward-based strategies.

Types of Artificial Intelligence Technology Innovation

AI technology can be categorized in various ways (Dynamic Intelligence Asia, 2025):

1. Classification by Capability

- **Artificial Narrow Intelligence (ANI) or Weak AI** – AI systems designed to perform specific tasks within a limited scope. These systems do not possess self-learning capabilities beyond their programmed functions. Examples include robotic service assistants in restaurants and virtual customer service agents.
- **Artificial General Intelligence (AGI) or Strong AI** – AI systems designed to match human cognitive abilities, including reasoning, problem-solving, planning, and abstract understanding. AGI is not yet fully realized and remains an area of ongoing research. Its potential development raises ethical and existential concerns about AI surpassing human intelligence.
- **Artificial Super Intelligence (ASI)** – AI systems that theoretically exceed human intelligence, allowing machines to operate independently beyond human control. ASI remains a concept explored in science fiction, depicted in movies, literature, and video games.

AI can also be classified based on its learning systems, including:

- Machine Learning (ML) – AI systems that autonomously learn from data through pattern recognition and classification.
- Deep Learning (DL) – Advanced neural networks that mimic human brain structures, enabling AI to process, predict, and validate data with greater accuracy (KANALYST, 2024).

3.2 Benefits of AI Technology Innovation Applications

AI technology innovation has wide-ranging applications across business and industrial sectors. Its primary objectives include enhancing efficiency, processing large-scale data at high speeds, reducing errors, and analyzing consumer behavior to support long-term business competitiveness and industry growth.

The overall benefits of AI technology innovation include:

- 1) Enhanced Efficiency and Productivity – AI automates repetitive and time-consuming tasks, reduces human workload, increases operational accuracy, and improves data-driven decision-making for organizations.
- 2) Innovation and New Opportunities – AI supports business expansion by developing customer-centric products and services. It also assists scientists and researchers in analyzing complex datasets and generating predictive models.
- 3) Improved Quality of Life – AI is integrated into medical diagnosis, drug development, education, transportation, and virtual assistants, leading to more efficient healthcare, personalized learning experiences, autonomous vehicles, and intelligent automation.

4) Better Decision-Making – AI provides data-driven insights that enhance strategic planning, trend forecasting, and decision-making accuracy.

5) Economic and Social Transformation – AI drives economic growth, market evolution, and workforce adaptation, necessitating new skill sets and labor market restructuring.

AI Technology Innovation Applications in Business and Government Sectors

1) AI Applications in the Business Sector

AI technology innovation is becoming central to the digital economy, influencing daily life through virtual assistants (e.g., Siri), self-driving cars (e.g., Tesla), and AI gaming algorithms (e.g., Google AI). Businesses leverage AI for:

- Market trend detection to reduce financial risks.
- Customer service enhancement via AI-powered virtual assistants.
- Document analysis and compliance verification to ensure regulatory accuracy (Palani Velu, 2020).

Examples of AI implementation in business (KATALYST, 2024):

- Personalized Marketing – AI-driven marketing tailors customer experiences based on behavioral data analysis. For example, Starbucks utilizes AI to send personalized promotions to loyalty program members based on their preferred purchases.
- Facial Recognition for Customer Insights – AI-powered computer vision recognizes customer identities and behaviors. Walmart employs facial recognition technology to track shopper movement, analyze purchasing patterns, and optimize in-store inventory management.

- AI-Powered Robotics for Logistics – AI optimizes delivery operations. JD.com, a Chinese e-commerce giant, deploys autonomous drones to deliver products in remote areas, reducing delivery times from 2 hours to just 20 minutes.
- AI-Based Warehouse Management – Retailers like H&M use AI-driven localization strategies to analyze consumer demand and optimize inventory distribution for improved efficiency.

Industry-Specific AI Applications (World Economic Forum, 2025):

- Financial Services – AI enhances fraud detection, risk assessment, and AI-powered chatbots for personalized customer service.
- Consumer Goods Industry – AI improves product research and development, smart virtual assistants, and data-driven business planning.
- Media, Entertainment, and Sports – AI personalizes content recommendations and enhances creative processes.
- Telecommunications – AI automates network management, predictive analytics, and customer support.
- Energy Sector – AI optimizes energy production, grid management, and sustainability efforts.
- Healthcare Industry – AI assists in clinical decision-making, disease diagnostics, and patient management.

2) AI Applications in the Public Sector

Governments worldwide increasingly integrate AI into public administration and service delivery. Examples include:

- AI-driven medical research to develop new treatments and precision medicine.
- Geolocation tracking for emergency response to expedite assistance for citizens in need.

- Big Data analytics to identify societal issues, predict emerging trends, and inform policymaking.
- Public welfare administration, such as social benefits, healthcare services, and security systems (Electronic Transactions Development Agency, 2024).

Examples of AI adoption in government (Anchalee Juangchan, 2024):

- Tax Administration – The Thai Revenue Department utilizes AI to analyze online transactions and detect tax evasion through web scraping technologies.
- Medical AI Systems – Siriraj Hospital collaborates with Fujifilm Thailand, Lunit Inc., and J.F. Advance Med to implement AI-powered diagnostics for disease screening and COVID-19 analysis.
- Law Enforcement and Public Safety – AI assists public security agencies in managing urban surveillance and crime prevention.

International AI applications in government (Electronic Transactions Development Agency, 2023):

- United States – The New York Social Welfare Department employs AI to digitize and analyze official documents, while the Atlanta Fire Department predicts fire incidents with 73% accuracy.
- Canada – The Surrey Municipal Government uses AI chatbots to provide real-time public information.
- Australia – The Australian Taxation Office's AI chatbots handle over 3 million citizen inquiries, achieving an 88% issue resolution rate during first interactions.

AI technology innovation is revolutionizing business operations, public services, and economic structures. Its applications range

from enhanced decision-making and automation to personalized customer experiences and predictive analytics. However, data privacy, labor market shifts, and ethical considerations remain key challenges in AI adoption. Understanding and strategically implementing AI innovation will be crucial for long-term economic and societal advancements.

4. The Application of Artificial Intelligence Technology in Tourism

4.1 Forms and Applications of Artificial Intelligence in Tourism

Artificial intelligence (AI) technology innovation has led to significant transformations in the tourism industry, enhancing its potential to address challenges and introduce new opportunities. The adoption of AI technology in various tourism sectors has been growing significantly, particularly in response to the COVID-19 pandemic. AI is reshaping the travel and tourism industry by offering businesses opportunities to improve efficiency, enhance customer experiences, and maintain competitiveness in an evolving market. AI has revolutionized both business operations and consumer experiences in multiple aspects (BAE Ventures, 2024).

AI's ability to perform complex tasks, learn, and improve enhances business efficiency by saving time and costs while reducing errors and ensuring rapid service delivery. Many hotels and accommodations integrate AI technology to provide quick customer service, introduce new products, enhance traveler flexibility, and improve personalized travel experiences through tailored recommendations and instant response mechanisms (Saxena, 2021).

The application of AI technology in tourism supports key areas (OECD, 2024), such as improving visitor experiences through interactive and personalized engagements, ensuring seamless travel, providing 24-hour

services, increasing accessibility and audience engagement, enhancing marketing intelligence and customer segmentation, optimizing visitor flow management through real-time data, and automating internal processes and core services. The specific applications of AI in tourism (OECD, 2021) include:

1) Strategic Planning – AI assists in trend analysis, business intelligence visualization, and customer data processing. It also supports ESG (Environmental, Social, and Governance) impact assessments, supplier reliability evaluation, and regulatory compliance.

2) General Administration – AI facilitates human resource management, skill development, accounting, finance, and internal communication through AI-driven training platforms and interactive learning systems. It also improves knowledge-sharing and real-time information exchange among tourism stakeholders.

3) Intelligent Business Systems and Product Development – AI is employed for organizational data analysis, large-scale production, and customer insights. Automated prototyping, digital infrastructure models, and predictive performance evaluations improve cost efficiency and minimize service disruptions.

4) Marketing and Sales – AI enhances market analysis through dynamic pricing strategies, AI-assisted content creation, visual communication, and branding strategies.

5) Operations Management – AI supports contract management, smart logistics, real-time supply chain tracking, and automated traveler navigation. AI-based facial recognition is used for visa applications, border control, and security screening.

6) Digital Tourism Products – AI optimizes accessibility and personalization of virtual tours, museum and cultural site experiences, interactive exhibits, and historical

reconstructions using generative AI. It also facilitates cultural heritage documentation and analysis of ancient texts.

4.2 AI Applications in International Tourism

1) Government Applications of AI in Tourism

- Sentiment Analysis and Brand Management – The Georgia National Tourism Association (GNTA) utilizes AI to analyze traveler emotions on social media, compiling insights from over 700,000 travelers into a guidebook, *Emotions are Georgia*, aimed at attracting global tourists (Saxena, 2021).
- AI for Smart Cities and Transportation Hubs – The U.S. Federal Aviation Administration (FAA) employs AI and advanced data science models to predict flight demand and analyze emerging trends in the tourism sector (National Science and Technology Development Agency, 2024).
- Tourist Behavior and Preference Analysis – Tourism Toronto in Canada utilizes AI to analyze big data from social media, booking trends, and spending patterns to refine targeted marketing strategies and optimize tourism offerings (OECD, 2024).
- AI-Based Sustainable Tourism Recommendations – The German Federal Ministry for the Environment developed the AI-based Recommender for Sustainable Tourism (AIR) to optimize visitor distribution, enhance tourism experiences, and support environmental conservation through real-time insights (OECD, 2024).

2) AI Applications in International Business Sectors

- AI as a Concierge Assistant – Hilton Hotels employs AI for concierge services, providing guests with travel

and restaurant recommendations. The AI assistant learns from each human interaction to improve communication quality (Saxena, 2021).

- Tourist Flow Management – Disneyland integrates AI and IoT sensors to monitor guest movement, optimize crowd control, and enhance visitor experiences using real-time data (OECD, 2024).
- Security Optimization – Major international airports (Charles de Gaulle, Los Angeles, Vancouver, San Jose) utilize AI-powered facial recognition for automated passenger verification, reducing wait times and enhancing security screening (OECD, 2024).
- Enhanced Travel Planning – Expedia incorporates ChatGPT-powered AI for personalized travel recommendations, while Alibaba's AI-enabled hotel in Hangzhou operates fully through AI-driven robots (National Science and Technology Development Agency, 2024).
- Customer Sentiment Analysis – Cathay Pacific's AI Innovation Center automates customer sentiment classification, optimizing service response strategies and pricing adjustments (OECD, 2024).

4.3 AI Applications in Thailand's Tourism Industry

Thailand's adoption of AI in tourism is rapidly expanding, with significant potential to transform travel experiences and enhance the competitiveness of local businesses. AI

applications in Thai tourism include personalized travel planning, virtual experiences, marketing strategies, and customer service enhancements.

According to SiteMinder's Changing Traveller Report 2025 (SiteMinder, 2025), Thai travelers demonstrate a 98% AI adoption rate for trip planning, booking, and accommodation experiences, integrating technology with work flexibility. Thailand is emerging as a global leader in combining leisure, work, and digital tools in travel.

1) Government AI Applications in Thai Tourism

- National Tourism Digital Transformation – The Thai government's Tourism Hub Initiative aligns with the Tourism Authority of Thailand (TAT)'s PASS Strategy (Partnership 360, Accelerate Access to Digital World, Subculture Movement, Sustainably Now), promoting AI for database management and digital content creation (Thai Travel Press, 2024).
- TAGTHAi Digital Concierge Platform – A collaboration between the public and private sectors, TAGTHAi offers AI-driven trip planning, real-time travel assistance, and emergency services, integrated with Google Cloud's "Design My Trip" generative AI (Tourism Authority of Thailand, 2023).
- Virtual Tourism and AI-Powered Marketing – The TAT's Virtual Tour Initiative features 3D virtual experiences of Phimai Historical Park, Wat Sri Chum, and private-sector attractions like Mahanakhon Tower and Museum Siam (TAT, 2023). Additionally, the "AI Travel Horoscope" campaign merges astrological predictions with AI-powered destination recommendations (TAT, 2024).
- Thailand CONNEX – National Digital Tourism Platform – A collaboration between DEPA, Travizgo Technology,

and TAT, Thailand CONNEX integrates AI-powered tourism data banks, digital tokens, and B2B travel platforms to enhance industry competitiveness (Thailand CONNEX, 2025).

2) AI Applications by Thai Businesses

- Gother Travel Platform – A collaboration between Search Engine Optimization Co., Beacon Venture Capital, and Krungthai Ventures, Gother integrates AI for seamless travel bookings, lifestyle-driven tourism, and centralized financial transactions (Gother, 2024).
- Siam AI Corporation's Tourism LLMs – Built on OpenThaiGPT and NVIDIA NeMo™, this AI system provides personalized travel recommendations, real-time local insights, and destination discovery (TECHSAUCE, 2024).
- AI Skills Training for Tourism – Microsoft Thailand launched the AI Skills for AI-Enabled Tourism Industry initiative to train tourism professionals in AI adoption for content creation, multilingual communication, and economic opportunity development (Microsoft, 2024).

AI technology innovation is revolutionizing Thailand's tourism sector by enhancing strategic planning, customer engagement, marketing, and operational efficiency. As AI adoption continues to grow, Thailand is well-positioned to become a global leader in AI-driven tourism innovation.

5. Conclusion

Artificial intelligence (AI) technology innovation plays a crucial role in enhancing competitiveness and addressing challenges in the tourism industry. Its application has been continuously increasing both in Thailand and globally. Internationally, government agencies

have adopted AI technology innovation to formulate policies and collect data, such as analyzing human emotions through social media interactions of travelers and studying tourism behavior. AI is also utilized in managing visitor flows, offering AI-powered travel planning tools in applications like ChatGPT, and improving tourism-related decision-making.

In Thailand, the application of AI technology innovation in tourism has significantly contributed to solving industry challenges and enhancing its potential. The government primarily uses AI to support tourism businesses in the private sector, analyze tourist behavior for policy formulation, and facilitate travel services. Examples include the development of TAGTHAi, a digital concierge platform that enhances travel convenience, and the National Digital Tourism Platform, Data Bank, and Token (Thailand CONNEX), which leverages digital innovation to improve the competitiveness of tourism enterprises. Meanwhile, the private sector in Thailand focuses on developing applications that streamline travel experiences, such as Tourism LLMs, which operates on OpenThaiGPT, and integrated travel platforms offering comprehensive tourism services and centralized financial transactions.

However, several critical considerations remain, including job displacement in certain professions, data privacy and security concerns, and potential AI misuse. Issues such as the spread of misinformation could lead to social problems and financial losses. As AI technology continues to evolve in the tourism industry, addressing these concerns is essential for sustainable and responsible AI-driven tourism development.

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