The Use of AI Media Innovations to Enhance the Yield and Quality of Durian Production among Farmers in Chanthaburi Province

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Abstract

This study aims 1) to examine the acceptance and use of artificial intelligence (AI) Media innovations among durian growers in Chanthaburi Province, and 2) to analyze the effects of AI innovations on crop yield, product quality, and production costs. Qualitative research design was employed, using purposive sampling to select participants. The key informants consisted of durian farmers who had adopted AI innovations and those who had not yet adopted them but had potential access, totaling ten participants. Data was collected through semi-structured in-depth interviews and field observations within the orchard context. The data were analyzed using thematic content analysis.

The findings revealed that 1) regarding acceptance and use, farmers tended to perceive AI Media innovations as “smart systems or applications that assist decision-making” rather than in technical terms. Common applications included automated environmental monitoring and irrigation fertilization systems, orchard data-analysis applications, and drone-based imaging combined with AI driven diagnostic systems. Key motivations for adoption were clearly observable benefits, ease of use, and support from technical specialists. Major barriers included high initial investment costs, technological uncertainty, limited digital literacy, and unstable internet infrastructure. Notably, farmers did not rely on AI systems to replace experiential decision-making but rather used them as alerts and supplementary information, and 2) Regarding the effects of AI innovation on production outcomes, farmers perceived an increase in yield per rail due to reduced losses stemming from water mismanagement and plant stress. Product quality improved, with a higher proportion of export-grade durians and fewer rejected or defective fruits. Although fixed costs increased due to technological investment, variable costs related to fertilizers, water, chemicals, and labor were reduced, resulting in lower unit production costs. Farmers also demonstrated a shift toward data-driven decision-making and greater emphasis on GAP and GI standards. Overall, the findings indicate that the integration of AI innovations in durian orchards in Chanthaburi represents a systemic advancement in orchard management, supporting long-term improvements in productivity, quality enhancement, and sustainable cost management.

Keywords: *Artificial Intelligence Innovation, Durian, Chanthaburi Farmers*

Introduction

In the twenty-first century, the global transition toward a digital era has transformed data into a critical resource that drives economic and social development. Artificial Intelligence (AI) has emerged as a core technology capable of processing massive datasets, learning complex patterns, and enabling automated decision-making with high speed and precision (Russell & Norvig, 2021). Key capabilities of AI-driven media innovations include machine learning, natural language processing, image analysis, and automated decision-support systems. These capabilities help reduce human error, enhance operational efficiency, and strengthen the competitiveness of organizations across the public sector, private enterprises, and local communities.

Economically, AI innovations are increasingly recognized as a “new engine of growth” that enhance productivity and create added value across multiple industries. A study by the McKinsey Global Institute indicates that the application of AI through automation, predictive analytics, and personalized products and services could contribute trillions of dollars to global economic growth annually (Manyika et al., 2017). These insights affirm that AI is not merely a technological tool but a foundational infrastructure reshaping managerial thinking, organizational systems, and development trajectories of modern societies (Brynjolfsson.et al., 2014).

Agriculture—an economic backbone for many countries, including Thailand—has been profoundly affected by this digital transformation. Within the framework of “smart agriculture,” AI innovations have been adopted to analyze soil, water, and climate conditions, detect plant diseases and pest infestations, predict crop yields, and manage production resources with precision. Research confirms that AI-driven technologies can significantly increase yields, reduce losses, and improve agricultural product quality, particularly for high-value crops that require intensive data monitoring and have complex production cycles, such as tropical fruit trees. The integration of drones with AI technology further enhances the rapid detection of plant abnormalities, reduces risks from diseases and pests, and supports data-driven decision-making by farmers (Agrawal, 2024).

In Thailand, durian is one of the country’s most important economic crops, generating substantial national income, especially through exports to major markets such as China, Hong Kong, and ASEAN countries, where volume, quality, and safety standards are highly emphasized. Chanthaburi Province is recognized as one of Thailand’s most prominent durian production areas and is regarded as the fruit capital of the eastern region due to its favorable climate, soil conditions, and abundant water resources (Chanthaburi Provincial Agriculture Office, 2025). With vast agricultural land dedicated to durian cultivation, durian farmers play a crucial role in driving both provincial and national economies.

Despite relatively high incomes compared to other agricultural sectors, durian farmers in Chanthaburi continue to face numerous challenges. These include rising production costs—fertilizers, pesticides, labor expenses, and orchard maintenance—along with persistent biological threats such as Phytophthora root, pink disease, and other fungal infections. Climate-related risks such as droughts, floods, and unpredictable weather patterns further compound production uncertainty (Paiboon & Panamas, 2019). At the same time, the durian supply chain is subject to growing pressure from export market standards, particularly regarding fruit maturity, chemical residue safety, and consistency of quality across the province (Department of Agricultural Extension, 2024; Department of Agriculture, 2022).

In response, quality control measures for Chanthaburi durian have become increasingly stringent. These include the adoption of dry matter standards (ACFS 3-2024), promotion of GAP and GI certifications for "Chanthaburi Durian," pre-harvest inspection policies, and the "Four Nos" standard—No immature fruit, No pests, No misrepresentation, and No prohibited chemicals—to prevent substandard produce from entering markets (National Bureau of Agricultural Commodity and Food Standards, 2023; Ministry of Agriculture and Cooperatives, 2025). These measures illustrate that durian quality is not solely determined at the orchard level but is linked to standardized systems across the entire production and marketing chain.

Amid these challenges, durian farmers in Chanthaburi have increasingly turned to modern technologies and management systems, especially those that reduce costs, minimize risks, and enhance product quality. Examples include real-time orchard monitoring systems, application-based data analytics, and various AI-driven innovations (Natthayut Amornkul.et al., 2024). However, AI adoption among farmers remains limited due to constraints such as unfamiliarity with technology, negative attitudes, uncertain economic returns, high initial investment costs, and gaps in digital infrastructure (Pulisarn Krueakam.et al., 2018).

These contextual conditions lead to key academic and practical questions: How do durian farmers in Chanthaburi perceive, accept, and utilize AI-driven media innovations in their orchard management? How is AI interpreted and integrated into real agricultural practices? What patterns of application exist, and what factors facilitate or hinder its adoption? Furthermore, how do farmers perceive the impact of AI innovations on production volume, product quality, and production costs.

Motivated by these questions, the present study adopts a qualitative research approach to explore farmers' experiences, perceptions, decision-making processes, and perceived outcomes regarding the use of AI-driven media innovations in durian orchard management in Chanthaburi Province. The objectives of this study are: (1) to examine the acceptance and use of AI-based media innovations among durian farmers in Chanthaburi, and (2) to analyze the effects of AI utilization on production output, product quality, and production costs.

This introduction therefore establishes the significance of AI-driven innovations in agriculture particularly within the context of Chanthaburi durian production while highlighting existing knowledge gaps concerning farmers' perspectives. The study aims to fill these gaps and generate practical and policy-oriented insights that can contribute to sustainable enhancement of durian yield and quality in the province.

Conceptual Framework

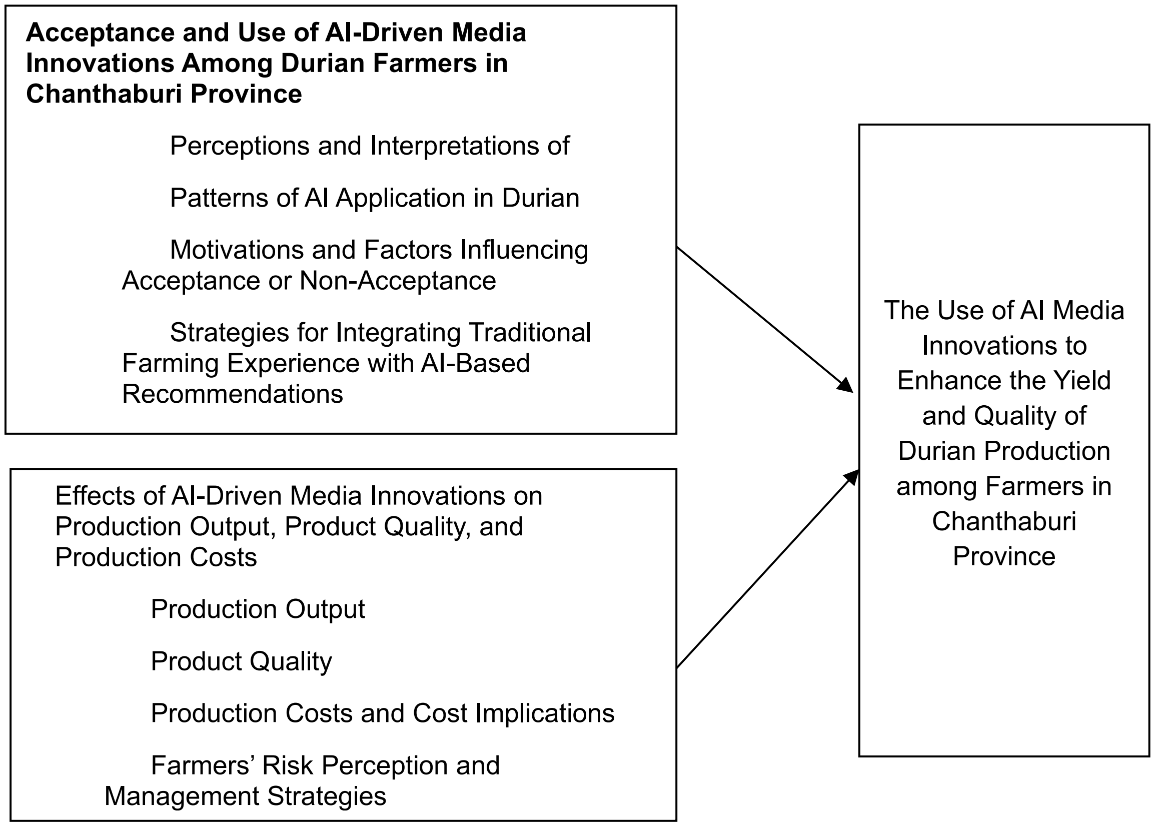

Figure 1: Research Conceptual Framework for The Use of AI Media Innovations to Enhance the Yield and Quality of Durian Production among Farmers in Chanthaburi Province

Research Objectives

1. To examine the acceptance and use of AI-driven media innovations among durian farmers in Chanthaburi Province.

2. To analyze the effects of AI-driven media innovations on production output, product quality, and production costs among durian farmers in Chanthaburi Province.

Literature Review

1. Artificial Intelligence Media Innovations

Artificial Intelligence (AI) media innovations refer to technologies capable of processing large and complex datasets, learning underlying patterns, and generating decisions that traditionally rely on human judgment. In the digital era, where data volume and variability continue to accelerate, AI has become a central driver of media innovation across diverse sectors, including industry, healthcare, agriculture, and logistics (Russell & Norvig, 2021). Core capabilities of AI-based media innovations include machine learning, natural language processing, image analysis, and automated decision-making. These technologies enable systems to operate with greater speed, accuracy, and reliability while reducing human error. From an economic and social perspective, AI innovations are increasingly regarded as a “key engine of growth,” enhancing productivity, lowering operational costs, and strengthening competitiveness for organizations at both local and global scales. According to the McKinsey Global Institute, AI has the potential to generate trillions of dollars in global economic value each year through automation, predictive data analytics, and the development of personalized products and services (Manyika et al., 2017). This underscores the idea that AI is not merely a technological tool but a new form of infrastructure that shapes organizational thinking and modern business practices. The rapid adoption of AI in the agricultural sector—which forms the economic foundation of many countries—has been especially prominent under the concept of “smart agriculture.” AI technologies are utilized to analyze soil, water, and climatic conditions; diagnosing plant diseases; forecast yields; and manage production resources with precision. Research shows that AI can significantly increase crop yields, reduce losses, and enhance agricultural product quality, particularly in high-value crops requiring intensive data monitoring, such as tropical fruit trees. Additionally, the integration of drones with computer vision technologies allows farmers to detect abnormalities in crops more rapidly, thereby reducing risks from diseases and pests with greater efficiency (Agrawal, 2024).

Beyond its technical functions, AI also influences human learning ecosystems and skill development. It supports strategic decision-making, enhances innovative thinking in media environments, and provides new opportunities for addressing complex problems. AI media innovations thus extend beyond technological advancement and function as a “catalyst for transformative change” in contemporary society (Brynjolfsson.et al., 2014).

2. Durian Farmers in Chanthaburi Province

Chanthaburi Province is one of Thailand’s most significant durian-producing regions and is widely recognized as the “fruit capital of the eastern region.” Its climatic conditions, soil characteristics, and abundant water resources are highly conducive to fruit cultivation, particularly durian, which serves as the province’s primary economic crop (Chanthaburi Provincial Agriculture Office, 2025). A large proportion of agricultural land in the province is dedicated to durian production, positioning durian farmers as key contributors to both provincial and national economic development. Income from durian cultivation accounts for a substantially higher share of farmers’ earnings compared with other economic crops. Demographically, most durian farmers in Chanthaburi are male, with an average age of around 50 years and above and have more than a decade of experience in durian cultivation. The majority have completed secondary or vocational education. These characteristics indicate that while local farmers possess extensive experiential knowledge, they often face limitations in technological skills and modern management competencies Nevertheless, several reports highlight that durian farmers in Chanthaburi earn significantly higher average incomes than farmers in other sectors due to the strong export market for durian—particularly the high demand in China—which has driven continuous expansion of cultivated areas over recent years. Despite their relatively high-income levels, durian farmers face substantial production costs, including expenses for fertilizers, pesticides, labor, and orchard maintenance. These costs are particularly high in orchards located in areas less suitable for durian cultivation, where additional inputs are needed to mitigate production risks. A study on cost structures in large-scale farming groups in Mueang Chanthaburi District found that "hidden costs," such as household labor and land opportunity costs, accounted for a higher proportion of overall expenses than visible costs, thereby influencing farmers' profitability (Paiboon Satirakosolwong & Panamas Triwankul, 2019). In terms of agricultural extension needs, durian farmers in Chanthaburi place strong emphasis on acquiring knowledge related to pest and disease management, production cost reduction, and the use of technologies that enhance fruit quality. Such technologies include durian maturity testing systems, real-time orchard monitoring tools, and accurate weather forecasting applications. Many farmers have also begun participating in large-scale farming initiatives and GAP certification programs to improve market opportunities and strengthen consumer confidence domestically and internationally (Chanthaburi Provincial Agriculture Office, 2025). Although Chanthaburi farmers possess high production potential and relatively strong income levels, they continue to encounter persistent challenges, including Phytophthora root rot, pink disease, drought, flooding, and steadily increasing production costs. These constraints compel farmers to adapt by integrating new knowledge, modern orchard-management technologies, and smart-agriculture systems in order to enhance production efficiency and remain competitive in the global market.

3. Durian Quality in Chanthaburi Province

Durian quality in Chanthaburi Province is a matter of critical importance to farmers, agribusiness operators, and government agencies, given the province's role as one of Thailand's key production hubs and a major supply base for international exports. The Chinese market, in particular, places strong emphasis on food safety and rigorous quality standards. Consequently, maintaining durian quality extends beyond ensuring desirable flavor; it includes achieving appropriate maturity, ensuring chemical safety, and maintaining consistent production standards across the province (Department of Agricultural Extension, 2024; Department of Agriculture, 2022). One of the most crucial mechanisms for quality control is the application of scientific criteria, such as measuring dry matter content to verify fruit maturity prior to harvest. According to the national agricultural commodity standard for durian (ACFS 3–2024), Monthong durians are considered harvest-ready when their dry matter content reaches at least 32%, while Chanee and Puangmanee varieties must reach at least 30%, and Kradumthong must reach 27% (National Bureau of Agricultural Commodity and Food Standards, 2023). The application of these standards in Chanthaburi has provided a clear, science-based method for distinguishing between high-quality durians and immature or substandard fruits. A concrete example of quality-oriented production is found in the "Namkrooy Large-Scale Durian Farming Group" in Moo 14, Na Yai Am Subdistrict, Chanthaburi Province. All members of this group are certified under GAP standards, and several have received geographical indication (GI) certification for "Chanthaburi Durian," highlighting the unique quality characteristics tied to the province's geographical identity (Department of Agricultural Extension, 2024). Their produce is well-recognized for its superior physical appearance and flesh attributes, including golden-orange coloration, smooth texture, sweet taste, mild aroma, dark green shell, and sharp spines—qualities that match consumer preferences in mid-range to premium markets. From a quality management perspective, the Namkrooy group has implemented modern orchard management systems, such as dry matter testing, designated harvest dates for specific varieties, and a "Check Before Cut" policy to prevent immature durians from entering the market. Durians with dry matter levels below the required thresholds are classified as immature (Department of Agricultural Extension, 2024; National Bureau of Agricultural Commodity and Food Standards, 2023). These measures help reduce the risk of product rejection in export markets and enhance the positive image of Chanthaburi durian as a premium-quality brand. However, maintaining durian quality in the province remains challenging due to certain practices within the production–distribution chain, such as harvesting immature durians to meet early market demand or using chemicals to artificially accelerate ripening. These practices contribute to the circulation of low-quality fruits and undermine consumer confidence both domestically and internationally. Notably, several crackdowns on illegal trading of immature durians in Chanthaburi—jointly enforced by the Department of Agriculture and provincial authorities—demonstrate the government's seriousness in enforcing quality control regulations (Department of Agriculture, 2022). To address these issues, the government has implemented proactive measures such as the "Four Nos" policy: *No immature fruit, No pests, No fraudulent certification, and no artificial coloring/No prohibited chemicals*. This policy, applied to eastern durian-producing provinces including Chanthaburi, aims to ensure that durians entering the market meet appropriate maturity standards, are free from chemical residues, and are accompanied by clear traceability documentation (Ministry of Agriculture and Cooperatives, 2025). When integrated with GAP, GI, and national agricultural standards, these measures significantly strengthen the quality assurance framework for durian production in Chanthaburi.

4. Acceptance and Use of AI-Driven Media Innovations Among Durian Farmers

The acceptance and utilization of Artificial Intelligence (AI) media innovations in agriculture have increasingly become essential factors in enhancing production efficiency, particularly among durian farmers in eastern Thailand, where durian represents the region's primary economic crop. The adoption of AI technologies for environmental monitoring, disease and pest detection, yield forecasting, and cost management has demonstrated significant potential to improve both productivity and product quality. However, farmers' acceptance of such technologies depends on various factors, including attitudes toward innovation, knowledge readiness, perceived economic value, and the level of support from government agencies (Teerawat Phatchatatak & Wasin Chuprayoon, 2024). Research on digital technologies in agriculture indicates that farmers are more likely to adopt AI innovations when they perceive clear and tangible benefits, such as reduced production costs, lower risks associated with diseases and drought, and improved opportunities to produce export-grade. Additionally, ease of use and the availability of guidance or on-site technical support are critical determinants of farmers' willingness to adapt and experiment with new technologies. Several studies highlight that when technologies are overly complex or when farmers lack access to local support personnel, their confidence in adopting such innovations decreases significantly (Pulisarn Krueakam, et al., 2018). In practical applications, AI innovations in durian orchards typically include automated weather and humidity monitoring systems, soil and nutrient analysis applications, image-based anomaly detection tools for leaves and fruits, and data-driven yield forecasting systems. These tools help farmers make more accurate decisions, especially in critical situations such as outbreaks of Phytophthora root rot or unpredictable climate conditions (Department of Agriculture, 2022). The growing interest in these technologies reflects their proven ability to reduce losses and enhance overall orchard management efficiency. Nevertheless, challenges persist regarding the adoption of AI innovations among durian farmers. Key obstacles include high initial investment costs, limited familiarity with digital technologies, and concerns about the reliability or accuracy of AI-generated recommendations (Nitin & Bal Gupta, 2023). Many farmers still perceive AI as distant or complicated, and some remain skeptical about whether technological systems can match the value of their own experiential knowledge. Furthermore, infrastructure limitations—such as unstable internet connectivity in certain areas—pose significant constraints, particularly for technologies that require real-time data transmission (National Economic and Social Development Council, 2021). Looking ahead, the adoption of AI technologies in durian orchards is expected to grow steadily, especially if farmers receive adequate knowledge support, hands-on training, and continued promotion from both governmental and private-sector organizations. With appropriate integration, AI innovations can be applied in ways that are both practical and economically beneficial—whether through increased productivity, enhanced quality control, or reduced production costs. Ultimately, the effective use of AI has the potential to strengthen the competitiveness of Thai durian in global markets over the long term.

Research Methodology

This study employed qualitative research methodology. The details of the research process are presented as follows:

1) Key Informants

Durian farmers who currently use AI-driven media innovations, including intelligent environmental monitoring systems, soil and nutrient analysis applications, disease–pest forecasting tools, irrigation and fertilizer planning systems, and yield-analysis technologies (n = 5) Durian farmers who have not yet adopted AI-driven media innovations, but have access to the technologies or have been encouraged to use them (n = 5).

2) Selection of Informants

Purposive sampling was used to recruit key informants based on the following criteria: Must be a durian farmer residing in Chanthaburi Province. Must have at least three years of durian cultivation experience. Must have used AI-based or intelligent agricultural systems continuously for at least two production seasons. Must be willing to participate and share real experiences.

3) Research Instruments

A semi-structured interview guide was used as the primary research instrument, consisting of the following themes: Basic information: age, experience, cultivated area, durian varieties, orchard management system. Understanding and attitudes toward AI-driven media innovations. Initial exposure and first-time experiences with AI technologies. Patterns and methods of using AI innovations in orchard management (purposes, timing, and stages of production). Perceived changes or developments related to AI use. Production-related outcomes: yield quantity, fruit quality (grading, defects, disease incidence), and production costs (fertilizers, chemicals, labor, time). Factors that facilitate or hinder the use of AI innovations to enhance durian production and quality in Chanthaburi. Expectations and suggestions for future development of AI innovations for durian farmers.

4) Data Collection Procedures

(1) Coordination

Collaboration was established with district agricultural offices, provincial agricultural agencies, large-scale farming groups, and community leaders to access actual farmers.

(2) InformedConsent

Participants were informed about the research objectives, duration, use of data, and confidentiality procedures before providing consent.

(3) In-Depth Interviews Conducted using semi-structured conversational techniques. Average duration: 15–45 minutes per participant. Interviews were conducted at the farmer's orchard or a location of their choice to observe real production contexts.

5) Participant Observation (Partial)

Observation of the actual use of AI technologies in orchards (when possible).

Observation of farmers' decision-making processes in orchard management.

6) Data Quality Assurance

Based on established qualitative credibility criteria:

(1) Credibility

Triangulation was employed by comparing information across multiple farmers, between farmers and officials, and between farmers and technology developers.

Member checking was conducted by allowing participants to review key interpretations made by the researchers.

(2) Transferability

Detailed description of the study context, orchard types, and farmer characteristics was provided to allow readers to assess potential applicability to other settings.

(3) Dependability and Confirmability

All research procedures were documented systematically.

Raw data (audio recordings, field notes) were preserved for audit trails and verification.

7) Data Analysis

Thematic Analysis was employed, consisting of the following steps:

Transcribing interview recordings into text.

Repeated reading to gain familiarity with the data.

Coding of textual data (e.g., codes on understanding AI, motivations, barriers, effects on yield, effects on cost).

Grouping codes into broader categories, such as:

Category 1: Perceptions and meanings of AI innovations from farmers' viewpoints

Category 2: Patterns of AI application in durian orchard management

Category 3: Perceived outcomes on yield, quality, and production costs

Category 4: Facilitating and hindering factors influencing AI adoption

Synthesizing themes and linking them with the research objectives and conceptual framework.

Research Results

1. Acceptance and Use of AI-Driven Media Innovations Among Durian Farmers in Chanthaburi Province From the in-depth interviews with durian farmers in Chanthaburi Province, four major thematic groups emerged regarding their acceptance and use of AI-driven media innovations. Theme 1: Farmers' Perceptions and Meanings of "AI-driven Media Innovations" Most farmers do not use the term "AI" explicitly. Instead, they understand AI as intelligent systems or applications that "think" or "assist" with decision-making—such as weather-forecasting apps, automatic irrigation–fertigation alert systems, or climate-control devices used in orchards Farmers who actively use these tools tend to view them as decision-support instruments, rather than complex technologies. Several respondents noted that they do not fully understand the technical principles of AI, but they value the outcomes, such as receiving timely alerts, automated calculations, and reduced trial-and-error. Their acceptance is guided less by conceptual knowledge and more by practical effectiveness. As one farmer expressed, "If it works and is easy to use, that's good enough—I don't need to know what's inside. "Theme 2: Patterns of AI Utilization in Durian Orchard Management Three major patterns of AI or intelligent system use were identified: Environmental Monitoring and Automated Irrigation/Fertilization Systems Farmers use sensors that measure soil moisture, temperature, and plant evapotranspiration. These systems connect to mobile applications or control boxes that "recommend" or "automatically activate" irrigation or fertilization according to preset conditions. Farmers reported improved water management, reduced problems of over- and under-watering, and greater consistency in orchard management—even when they are not physically present. Data-Analysis Platforms for Orchard Planning These include applications for recording fertilizer use, pesticide application, disease occurrences, and flowering/fruiting stages. Some platforms generate risk scores for diseases or plant stress based on user inputs and photos. Farmers appreciated the ability to track orchard history and view summarized analytics. Drone and Image-Based AI Technologies Used primarily by farmers with large

orchards or those supplying export companies. Systems analyze aerial images to detect abnormalities such as nutrient deficiencies, water stress, or early disease symptoms. These tools help pinpoint problems quickly and reduce labor-intensive scouting. Theme 3: Motivating and Limiting Factors for Acceptance or Non-Acceptance Facilitating Factors Clear, tangible benefits Many farmers adopted AI after experiencing severe problems (e.g., disease outbreaks or weather anomalies) and witnessing how AI tools helped provide early warnings or more timely responses. Guidance from intermediaries Assistance from agricultural extension officers, technology providers, or model farmers reduced fear and built confidence. Ease of use Systems with Thai language menus and simple interfaces were more readily accepted. Barriers to Adoption High initial investment Costs for sensors, control systems, drones, and subscription services remain prohibitive for many. Lack of technological confidence Farmers expressed concerns that system malfunction or incorrect readings could cause losses. Low digital literacy Particularly among older farmers who are less comfortable with smartphones or apps. Unstable internet infrastructure Poor connectivity hindered real-time system performance. Farmers who "have not yet adopted but have access" were generally interested but preferred to wait for more affordable options or observable success among peers. Theme 4: Strategies for Integrating Traditional Experience with AI Recommendations Farmers who successfully adopted AI systems emphasized integration, not replacement. They combine AI recommendations with experience-based judgment: Using system alerts as preliminary signals, followed by personal field inspection. Adjusting fertilizer/watering regimens by interpreting both AI suggestions and conventional knowledge. Employing AI-generated reports to support decisions on purchasing input or allocating labor. Farmers' comments highlight that AI enhances rather than replacing human expertise, improving clarity and confidence in decision-making.

2. Effects of AI-Driven Media Innovations on Production Output, Product Quality, and Production Costs Based on synthesis of in-depth interview data from AI-using farmers, the perceived outcomes are summarized into four major groups. Theme 1: Effects on Production Output Most farmers reported an increase in yield per rai after using AI systems for at least 1–2 production seasons. While yield did not rise dramatically in the short term, farmers observed: Reduced losses from water stress (too little or too much). Improved plant vigor and more consistent fruiting. Lower rates of premature fruit drop, attributed to weather alerts and optimized irrigation during critical stages. Theme 2: Effects on Product Quality Farmers linked improved quality to: Better timing of harvest using weather and nutrient data. More precise water management before flowering, fruit set, and pre-harvest periods. More consistent flesh texture and ripeness. Farmers supplying exporters noted: A higher proportion of export-grade fruits. Fewer issues with fruit spoilage during shipping. Better pricing due to increased trust from buyers who recognized the use of standardized, monitored systems. Theme 3: Effects on Production Costs Farmers described two-sided cost implications: Short-Term: Increased Fixed Costs Investment in devices, sensors, control units, drones, and platform fees. Some require upgrades to irrigation or electrical systems. Long-Term: Reduced Variable Costs and Better Cost Efficiency Reduced fertilizer, water, and chemical use due to data-based application. Lower labor requirements for monitoring, measuring, and irrigating. Improved quality increased revenue

per unit. Overall, many farmers perceived a reduction in cost per unit of output, despite higher initial technology costs. Theme 4: Effects on Farmers' Mindset and Risk Management Farmers reported changes in their orientation toward orchard management: Moving from intuition-based decisions to data-informed decision-making. Systematic record-keeping to feed data into AI platforms. Greater attention to weather patterns, drought indicators, flooding risks, and disease forecasts. Increased interest in pursuing GAP/GI certification alongside smart systems to enhance orchard credibility. These shifts indicate that AI adoption leads not just to technical benefits but to a systemic upgrade in orchard management, increasing farmers' confidence in handling complex risks.

Conclusion

1. Acceptance and Use of AI-Driven Media Innovations Among Durian Farmers in Chanthaburi Province

The findings indicate that farmers do not conceptualize AI-driven media innovations in technical terms, as framed in academic literature that describes artificial intelligence as a set of techniques enabling computers to "learn from data" without being explicitly programmed or to "think" on behalf of humans (Russell & Norvig, 2021). Rather, farmers perceive AI in more practical and experiential terms—as *"smart systems," "apps that think for you," or "decision-support tools"* embedded in devices and platforms such as automatic irrigation–fertilization systems, orchard data recording and analysis applications, or drone-based image analysis systems.

This perception aligns with policy- and macro-level perspectives that view artificial intelligence not merely as a specialized technology, but as a form of "new infrastructure" embedded across multiple operational processes, where end-users are not required to understand internal mechanisms as long as they can rely on concrete and useful outcomes (Brynjolfsson.et al., 2014; Manyika. et al., 2017). When compared with the smart agriculture literature, which often emphasizes the technical potential of AI in environmental data analytics, yield forecasting, and plant disease detection (Agrawal, 2024), the present study adds a field-based perspective: AI media innovations are accepted by farmers when they are translated into tangible, practice-oriented systems that can be directly integrated into everyday orchard management—such as setting irrigation parameters, viewing moisture graphs on a mobile phone, or using drone images to pinpoint abnormal areas—rather than when AI is discussed in abstract conceptual terms.

With respect to factors influencing acceptance, the findings show that farmers prioritize "empirical cost–benefit outcomes" above all else. They are more likely to adopt AI innovations when they can clearly see reductions in losses caused by disease, pests, drought, flooding, or management errors. This is consistent with the studies of Teerthawat Phatsatat & Wasin Chuprayoon (2024) and Kritsada Wattanasiri (2023), which found that farmers' willingness to adopt digital technologies increases when these technologies can be directly linked to cost reduction, risk mitigation, and improved opportunities to access high-value markets such as premium-grade export durian.

At the same time, the present findings corroborate the work of Pulisarn Krueakam. et al. (2018), as well as Nitin and Bal Gupta (2023), which highlight key barriers to AI adoption in agriculture. These include high initial investment costs for devices and systems, gaps in digital skills—particularly among older farmers—concerns about the reliability and trustworthiness of AI outputs, and structural constraints such as unstable internet connectivity in remote areas, which limit the effectiveness of real-time systems. The results therefore reinforce the idea that the promotion of smart agriculture cannot be achieved solely through technology provision; it must be accompanied by digital infrastructure and human support systems, including extension officers, experts, and model farmers—who act as intermediaries between technology and practical applications.

An important and noteworthy point is that farmers in this study do not perceive AI-driven media innovations as a replacement for their experience. Instead, they adopt a blended or hybrid approach, treating AI systems as warning mechanisms or "supplementary information sources" that help reduce uncertainty in decision-making. For example, when the system sends a low-moisture alert, farmers still inspect the orchard before deciding to irrigate; when the system reports elevated disease risk, they combine that information with direct field observation. This blending reflects a form of "hybrid intelligence" in which data from AI technologies and farmers' experiential knowledge are integrated. Such a configuration suggests that effective AI-driven media innovations should support and augment farmers rather than attempt to replace them.

2. Effects of AI-Driven Media Innovations on Production, Product Quality, and Production Costs

The findings are generally consistent with the broader smart agriculture literature, which suggests that AI-driven innovations can enhance production efficiency and upgrade agricultural product quality (Department of Agriculture, 2022). However, this study contributes by presenting these effects through the voices and lived experiences of durian farmers who actually employ AI systems in their orchards in Chanthaburi.

In terms of production output, most farmers did not claim an immediate, dramatic increase in yield. Instead, they emphasized loss reduction, particularly in relation to over- or under-irrigation, plant stress, and mismatches between management practices and actual weather conditions. Environmental monitoring systems connected to automated irrigation–fertilization controls helped farmers manage water and nutrient application more consistently and precisely, resulting in an increased number of healthy, productive trees per rai. This aligns with Agrawal's (2024) argument that AI in agriculture plays a critical role in "reducing losses and stabilizing yields," rather than merely pushing yield to its absolute maximum.

Regarding product quality, the findings highlight a systemic alignment between on-farm technologies and provincial/national standards, such as the ACFS 3–2024 dry matter criteria and the "Four Nos" policy of the Ministry of Agriculture and Cooperatives. Farmers who used weather, nutrient, and water-management data from AI systems to determine scientifically appropriate harvest timing reported an increase in the proportion of high-grade and export-grade durians, and a reduction in rejected or spoiled fruit in containers. This corresponds with analyses by the Department of Agricultural Extension (2024), which point out that modern technologies, when combined with GAP/GI standards, help improve quality and strengthen market confidence.

A particularly interesting dimension is that some farmers reported receiving better prices because exporters had greater confidence in their quality-control systems and monitoring practices. This suggests that AI-driven media innovations influence not only the physical quality of produce but also contribute to building relational capital and credibility between orchards and buyers and indirectly reinforce the premium image of Chanthaburi durian in high-end markets.

In terms of production costs, the study confirms a dual-cost pattern. In the short term, fixed costs increase due to expenditures on equipment, sensors, control systems, drones, and modifications to irrigation and electrical infrastructure. Over the longer term, however, variable costs tend to decrease as farmers use fertilizers, water, and chemicals more efficiently and reduce certain labor costs related to monitoring and environmental measurement. These findings are in line with Paiboon Satirakosolwong and Panamas Triwankul (2019), who argue that “invisible costs”—such as time, household labor, and imprecise management—significantly affect durian farmers’ cost structures. When farmers use AI-derived information to reduce “over-provisioning” or habitual over-application of inputs, the cost per unit of output tends to decline, even when technology-related expenses are taken into account.

The final and particularly prominent dimension concerns change in farmers’ mindset and risk management. A number of farmers began recording orchard data systematically due to the requirements of AI systems, monitoring trends in weather conditions, drought, flooding, and disease outbreaks in advance, and using these data for proactive decisions—such as labor planning, scheduling harvest and container loading, and investing in GAP/GI standards alongside intelligent systems. These changes resonate with policy-level perspectives that frame AI innovations as a “catalyst for transformation” in both production processes and agricultural risk management (National Economic and Social Development Council, 2021; Brynjolfsson. et al., 2014).

In summary, the use of AI-driven media innovations in durian orchards in Chanthaburi should not be understood merely as the installation of devices or applications. Rather, it represents a process of “systemic upgrading of orchard management” that spans the entire chain—from upstream (soil, water, and microclimate management), through midstream (plant care, fruit development, disease and pest control), to downstream (product quality, GAP/GI compliance, and market relationships). The outcomes perceived by farmers extend beyond production and cost figures to include greater security in coping with future risks and enhanced long-term competitiveness of Chanthaburi durian in global markets.

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