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Disrupting the Veterinary Value Chain through AI-Based Goat Health Management

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Abstract
The digital transformation of livestock production is creating new opportunities to redesign conventional veterinary service delivery. However, veterinary services in goat farming remain constrained by limited personnel, geographic accessibility, delayed disease detection, and relatively high service costs. This study examines how artificial intelligence can disrupt the veterinary value chain through Kambing Light Vision, an AI-based goat health management platform that integrates Computer Vision, disease detection, prediction confidence, and AI-assisted veterinary care recommendations. An exploratory qualitative case study approach was employed by analyzing the technology development process, veterinary service workflow, stakeholder roles, commercialization pathways, and potential business value. The results indicate that AI can shift preliminary health assessment from a predominantly veterinarian-dependent process toward a digitally assisted and farmer-accessible service. This transformation can shorten information flows, reduce service and transaction bottlenecks, improve veterinary triage, and create new value propositions for farmers, veterinary clinics, cooperatives, and agribusiness organizations. The analysis further identifies subscription-based Software as a Service, technology licensing, and managed veterinary services as potential mechanisms for converting AI capabilities into scalable business value. The study argues that the disruptive potential of AI does not lie solely in disease-classification accuracy but in its ability to reconfigure the veterinary value chain and transform how veterinary services are accessed, delivered, and commercialized. Kambing Light Vision therefore represents a transition from AI as a diagnostic technology toward AI-enabled veterinary service infrastructure with potential implications for digital agriculture and sustainable livestock business.

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1.0 INTRODUCTION

The digital transformation of agriculture is increasingly reshaping how livestock enterprises manage productivity, animal health, and operational decision-making (Abbasi et al., 2022). In goat farming, animal health remains a critical determinant of productivity and economic sustainability because delayed disease detection can increase treatment costs, reduce animal performance, and create risks of mortality and disease transmission. At the same time, conventional veterinary services often depend on physical examination and the availability of veterinarians, creating a service bottleneck particularly for small and medium-scale farmers. These conditions create an opportunity to redesign the veterinary service value chain through digital technologies that can provide faster, more accessible, and economically viable health-support services.

Artificial Intelligence (AI), particularly computer vision, provides an emerging opportunity to address this challenge by transforming animal health information into actionable digital services (Akbarein et al., 2025).

Previous research has demonstrated the potential of computer vision for identifying external diseases from visual characteristics, while the development of smart livestock systems has demonstrated the feasibility of integrating digital technologies into goat farming management. However, the application of AI in livestock has frequently been positioned as a technical solution for image classification rather than as a mechanism for restructuring how veterinary value is created, delivered, and captured. This distinction is important because technological innovation becomes economically disruptive when it changes not only the technology used by firms and farmers but also the relationships, processes, and transactions through which services are delivered.

The emergence of AI-based veterinary services therefore provides an opportunity to disrupt the veterinary value chain (Fang et al., 2026). Traditionally, the process of identifying animal health problems may involve observation by farmers, waiting for veterinary assistance, clinical examination, diagnosis, treatment recommendations, and subsequent monitoring. This sequential process can generate time, information, and transaction costs. An AI-enabled approach can shift part of the initial diagnostic process closer to the farm by allowing farmers to capture animal images using mobile devices and receive rapid visual assessment. The Kambing Light Vision platform proposed in this study extends this concept by integrating AI-based disease detection, real-time prediction confidence, and veterinary care recommendations within an integrated digital system. The proposed architecture also combines mobile access with edge–cloud processing, enabling the technology to operate under conditions where connectivity may be limited.

The disruptive potential of such a system extends beyond technological efficiency (Gemelgo et al., 2025). By moving initial health assessment from a veterinarian-centered process toward a digitally assisted farmer-centered process, AI can redistribute activities across the veterinary value chain. Farmers can obtain preliminary information more rapidly, veterinarians can potentially concentrate on cases requiring professional intervention, and livestock businesses can develop new digital service models. The proposed technology consequently creates opportunities for subscription-based services, industrial licensing, cooperative-based services, and managed services for veterinary clinics. Rather than simply introducing another digital application into goat farming, this transformation may create a new configuration of actors, activities, information flows, and value-capture mechanisms within the veterinary ecosystem.

This perspective is particularly relevant because the existing digital livestock ecosystem has increasingly incorporated IoT (Suhardjo et al., 2026), smart farming, and data-driven management, yet the health-service component remains an important opportunity for further integration. Previous studies have highlighted the potential of IoT-driven solutions for smart goat farming and the role of digital technologies in improving agricultural business efficiency (Junaedi et al., 2024). However, there remains a need to understand how AI-enabled veterinary technologies can move beyond operational support toward value-chain disruption and industry-level transformation. The gap is therefore not merely technological, but also strategic and business-oriented: how can AI change the structure of veterinary service delivery, reduce barriers to access, create new value propositions, and generate sustainable commercial opportunities?

This study addresses this gap by examining the disruptive potential of Kambing Light Vision as an AI-based goat health management platform. The study conceptualizes AI adoption not simply as the automation of disease classification but as a mechanism for restructuring the veterinary value chain through faster information acquisition, decentralized preliminary diagnosis, AI-assisted decision support, and digitally enabled service delivery. The platform's development toward industrial implementation and commercialization further provides a context for examining how technological innovation can generate new forms of value for farmers, veterinary service providers, and agribusiness actors. The proposed system is designed to progress from a tested prototype toward pre-commercial and commercial implementation, with the ultimate objective of achieving an industrially deployable technology.

Accordingly, this study aims to investigate how AI-based goat health management can disrupt the veterinary value chain and create new pathways for digital service delivery and business value creation. The study contributes to the literature by shifting the discussion of AI in livestock from technological capability toward the broader consequences of value-chain disruption, service transformation, and digital business opportunity. In doing so, it positions AI-based veterinary services as a potential catalyst for transforming not only how goat diseases are detected, but also how veterinary services are accessed, delivered, integrated, and commercialized.

2.0 LITERATURE REVIEW

Artificial Intelligence in Livestock Management

Artificial Intelligence (AI) has increasingly become an important component of digital transformation in agriculture and livestock management (Omotayo et al., 2025). AI enables agricultural systems to process large amounts of data, identify patterns, and support decision-making that would otherwise depend heavily on human observation.

In livestock production, the application of AI has expanded from production monitoring to animal health, behavioral analysis, disease detection, and operational management. The development of smart livestock systems also demonstrates that digital technologies can be integrated into livestock enterprises to improve efficiency and resilience. Previous research has highlighted the potential of IoT-based smart goat farming as an integrated approach to livestock management and food-security support (Jahrizal et al., 2025).

The business relevance of AI in livestock extends beyond automation. AI can transform information into a service that generates value for farmers and other actors within the agricultural ecosystem. This creates opportunities for digital platforms, data-driven services, and technology-enabled business models. Previous research on AI and organizational transformation has also emphasized the broader implications of AI for organizational processes and performance. Thus, AI adoption in livestock should not be viewed solely from a technological perspective but also from the perspective of how it changes the way agricultural services are organized and delivered.

Computer Vision for Animal Disease Detection

Computer vision represents one of the most promising AI applications for livestock health management because visual symptoms can provide important information regarding the condition of animals (Yang et al., 2025). Image-based systems can support the identification of visible abnormalities and provide preliminary information without requiring sophisticated diagnostic equipment. Previous research by the authors has explored the use of computer vision for external disease identification, demonstrating the relevance of image-based AI for health-related applications.

Within livestock production, image-based disease detection can reduce the dependence on continuous manual observation. The Kambing Light Vision approach builds upon this concept by applying Convolutional Neural Network (CNN) techniques to identify multiple goat health conditions, including normal conditions, scabies, mastitis, and other indications of skin or udder disease. The proposed system further incorporates transfer learning and ensemble learning to improve model sensitivity and specificity.

However, image classification alone does not necessarily constitute a transformation of veterinary services. A classification model primarily answers the question of what condition may be present, whereas a veterinary service requires additional processes concerning confidence, decision-making, recommended actions, and referral. This distinction provides the conceptual basis for extending AI from disease recognition toward AI-assisted veterinary decision support.

Digital Veterinary Services and Decision Support

The development of digital veterinary services represents a shift from conventional, location-dependent veterinary interactions toward technology-assisted health management (Arshad et al., 2025). Digital decision-support systems can potentially enable farmers to obtain preliminary information more rapidly while allowing professional veterinary resources to be directed toward cases requiring clinical intervention.

Kambing Light Vision is designed around this broader service concept. The proposed system does not stop at disease classification but provides a confidence score and generates care recommendations based on the detected condition and veterinary knowledge. Recommendations may include initial self-care, preventive action, or referral to a veterinarian. This creates an important distinction between AI as a diagnostic technology and AI as a veterinary service-enabling technology.

The integration of mobile and edge–cloud technologies further strengthens the potential accessibility of such services. The proposed architecture allows image processing through cloud or edge AI, making the system more suitable for agricultural environments with limited connectivity. Consequently, digital veterinary services can potentially reduce geographical and infrastructure barriers that constrain access to conventional veterinary services.

Value Chain and Digital Transformation

Digital transformation can alter the configuration of activities through which products and services create and deliver value (Verhoef et al., 2021). In livestock businesses, the veterinary value chain traditionally involves farmers, field workers, veterinarians, diagnostic processes, treatment decisions, and follow-up activities. When AI is introduced into this chain, some information-processing activities can be decentralized and performed closer to the point of production.

The Kambing Light Vision concept reflects such a transformation. The farmer becomes an active participant in the initial information-generation process by capturing images using a smartphone. The AI system subsequently processes the image, produces a prediction, provides a confidence score, and generates a preliminary recommendation. The resulting information can then support subsequent interaction with veterinary professionals.

This configuration suggests that the value created by AI is not limited to increased prediction accuracy. It may also emerge from reducing information asymmetry, shortening response time, lowering transaction costs, and reallocating activities among actors. Previous research on innovative business models and IoT-driven smart goat farming has demonstrated the relevance of digital technologies to the development of new management and business approaches in goat farming.

Disruptive Innovation in Veterinary Services

Disruptive innovation can be understood in this study as a transformation that changes how an established service is accessed, delivered, and valued (Gemelgo et al., 2025). From this perspective, an AI veterinary platform has disruptive potential when it does more than improve an existing diagnostic process. It becomes disruptive when it changes the underlying configuration of the service value chain.

Kambing Light Vision has several characteristics that support this perspective. First, it transfers part of the preliminary health-assessment process from centralized veterinary services toward farmers and field operators. Second, it combines disease detection, prediction confidence, and care recommendations in an integrated workflow. Third, it uses a lightweight computer-vision approach that can operate through mobile and edge devices. Fourth, it is specifically designed for goats, a segment that the proposal identifies as having relatively limited specialized AI veterinary solutions.

The disruptive potential therefore lies in the reconfiguration of veterinary service delivery, rather than merely in the introduction of a new AI algorithm. The technology can create a new interface between farmers, AI systems, veterinary professionals, and agribusiness organizations. This creates the possibility of a more decentralized, scalable, and digitally mediated veterinary ecosystem.

Digital Business Models and Value Creation

Technological disruption must ultimately be connected with a mechanism for creating and capturing economic value (Osei et al., 2025). AI-based veterinary services can potentially generate value through improved operational efficiency, reduced diagnostic delays, lower access costs, and new revenue streams for technology providers and veterinary service organizations.

The proposed Kambing Light Vision business concept identifies several potential commercialization mechanisms, including subscription-based services for farmers, industrial licensing for cooperatives, and managed services for veterinary clinics. These mechanisms indicate a transition from selling technology as a standalone product toward providing veterinary intelligence as a continuing digital service.

The platform also has potential for integration with broader digital livestock-management systems and IoT monitoring. Such integration could expand the value proposition from disease detection toward a broader animal-health management ecosystem. Therefore, the economic value of AI may increase as more actors, data, and services become connected within the platform.

Research Gap and Conceptual Position

The literature and previous studies reflected in the proposal demonstrate three important developments. First, AI and computer vision can support image-based disease identification (Feng et al., 2025). Second, IoT and digital technologies can improve smart goat farming management (Junaedi et al., 2026). Third, AI can support broader organizational and business transformation (Raina et al., 2026).

However, these streams remain insufficiently connected from a value-chain disruption perspective. Existing technology-oriented approaches tend to emphasize model performance and disease classification, while business-oriented approaches emphasize digitalization and efficiency. A research gap therefore exists in explaining how AI-based animal-health technology can reconfigure the veterinary value chain and create new mechanisms for service delivery and value capture.

This study addresses that gap by positioning Kambing Light Vision not simply as a disease-classification tool but as an AI-enabled veterinary service platform. Its conceptual contribution lies in connecting four dimensions: AI capability, veterinary service transformation, value-chain disruption, and business value creation. The proposed transition from a TKT 6 tested prototype toward TKT 7–9 industrial implementation further provides a practical context for examining whether technological innovation can evolve into commercially viable and industry-disruptive services.

Based on this literature positioning, the central proposition of the study is that AI-based goat health management can create business value not merely through technological efficiency, but through the disruption and reconfiguration of the veterinary service value chain.

3.0 METHODOLOGY

Research Design

This study adopts an exploratory qualitative research approach to examine how AI-based goat health management can disrupt the veterinary service value chain and create new opportunities for digital business value (Daum et al., 2022). The research focuses on Kambing Light Vision, an AI-based Computer Vision platform designed to detect goat diseases, provide prediction confidence, and generate AI-assisted veterinary care recommendations. The research design connects technological functionality with changes in service delivery, value-chain activities, stakeholder roles, and commercialization opportunities.

The study is positioned as a technology-enabled business transformation case study, where Kambing Light Vision serves as the focal case. This approach is appropriate because the proposed technology is being developed from a tested prototype toward industrial implementation and commercialization. The proposal

identifies the current technology readiness level at TKT 6 and targets TKT 9 through field testing, pre-commercial validation, and industrial implementation.

Research Object and Context

The research object is the veterinary value chain in smart goat farming, with Kambing Light Vision examined as a technological intervention within that chain. The analysis covers the interaction between four principal actors:

1. Goat farmers as end users and initial providers of animal-health information.
2. Veterinary professionals as providers of clinical verification and professional intervention.
3. Agribusiness or industry partners as technology adopters and potential service providers.
4. AI technology providers as developers and operators of the digital platform.

The industrial context is based on collaboration between the university research team and PT Ciera Cahaya Harmoni, which provides the field-testing environment, access to livestock-health data, operational testing, and clinical verification.

Data Collection

Data are collected through four complementary sources. First, technology and operational data are obtained from the development and testing of Kambing Light Vision. These include disease-image datasets, AI prediction outputs, confidence scores, system performance, and user feedback. The initial prototype had achieved 70% accuracy using a dataset of 300 goat disease images, while subsequent development focuses on expanding the field dataset and improving robustness.

Second, field observation is conducted during implementation at partner farms. Observation focuses on how farmers capture images, interpret AI outputs, respond to recommendations, and interact with veterinary services. Third, stakeholder interviews are conducted with farmers, veterinary professionals, industry representatives, and members of the technology development team. Interviews explore perceived changes in service accessibility, response time, operational efficiency, transaction costs, user value, and commercialization potential. Fourth, documentary data are obtained from the technology-development roadmap, operational procedures, business-model planning, and implementation documentation. The proposed commercialization mechanisms include farmer subscriptions, industrial licensing, and managed services for veterinary clinics.

Analytical Framework

The analysis is structured around the proposed veterinary value-chain disruption framework, consisting of four analytical dimensions:

AI capability → Service transformation → Value-chain disruption → Business value creation

AI Capability

The first dimension examines the technological capabilities that enable disruption, including:

- AI-based disease detection
- Multi-disease classification
- Real-time prediction confidence
- AI-assisted care recommendations
- Mobile accessibility
- Edge–cloud hybrid processing

These capabilities are derived from the architecture and functionality proposed for Kambing Light Vision.

Service Transformation

The second dimension evaluates how AI changes veterinary service delivery. Particular attention is given to:

- speed of preliminary assessment
- accessibility of veterinary information
- farmer participation in initial assessment
- reduction of dependence on immediate physical examination
- referral of cases requiring professional veterinary intervention

The analysis therefore distinguishes between AI replacing veterinarians and AI augmenting veterinary services. The proposed technology is positioned as an initial diagnostic-support and triage system rather than a replacement for professional clinical diagnosis.

Value-Chain Disruption

The third dimension identifies changes in the activities and relationships among farmers, veterinarians, technology providers, and agribusiness organizations. The conventional value chain is conceptualized as:

Farmer observation → Veterinarian visit → Clinical examination → Diagnosis → Treatment recommendation → Follow-up

The digitally enabled configuration is conceptualized as:

Farmer image capture → AI detection → Confidence assessment → AI-assisted recommendation → Veterinary referral when required → Follow-up and monitoring

The comparison examines whether AI reduces bottlenecks, shortens information flows, reallocates activities, and changes interactions between value-chain actors.

Business Value Creation

The fourth dimension evaluates the economic implications of the transformation. The indicators include:

- operational efficiency
- reduction in service-access costs
- faster decision-making
- scalability
- new revenue opportunities
- customer value
- market accessibility
- commercialization potential

The analysis also examines whether the technology enables recurring digital-service revenues through SaaS, licensing, or managed-service models, as proposed in the technology roadmap.

Data Analysis

Qualitative data from interviews and observations are analyzed using thematic analysis. The analysis proceeds through four stages: data familiarization, coding, categorization, and interpretation. Initial codes are organized around the four dimensions of the analytical framework.

The analysis then compares the conventional veterinary service process with the AI-enabled service process to identify changes in activities, actors, information flows, and value creation mechanisms. Evidence from stakeholder interviews and field observations is triangulated with technology-development and operational documentation.

Quantitative technology-performance information, particularly prediction accuracy and classification performance, is used as supporting evidence rather than as the primary unit of business analysis. The proposal identifies confusion matrix, sensitivity, specificity, and ROC analysis as mechanisms for validating the AI system with veterinarians serving as the clinical ground truth.

Business Model and Commercialization Analysis

To determine whether the technological disruption can translate into sustainable business value, the study analyzes the potential commercialization pathways of Kambing Light Vision. Three principal mechanisms are evaluated:

1. SaaS model → recurring subscription services for goat farmers
2. Licensing model → technology licensing for cooperatives or agricultural organizations
3. Managed-service model → AI-enabled veterinary services operated through veterinary clinics or industry partners

The analysis evaluates each model in terms of customer segment, value proposition, delivery mechanism, revenue mechanism, scalability, and stakeholder benefits. This is consistent with the proposal's emphasis on commercialization, market adoption, and expansion into broader livestock-health services.

Validation and Trustworthiness

Research validity is strengthened through methodological triangulation involving technology-performance data, field observations, stakeholder interviews, and documentary evidence. Clinical interpretation is supported by veterinary professionals, while business interpretation is assessed through industry and user perspectives.

The technology itself is evaluated through performance and operational indicators, including accuracy, robustness, stability, usability, and field performance. The development roadmap specifies progressive validation from TKT 6 through TKT 7–8 and ultimately TKT 9, including field implementation, multi-user trials, business feasibility validation, and commercialization.

Research Framework

The overall methodological logic can be summarized as:

AI Capability
↓
Digital Veterinary Service Transformation
↓
Reconfiguration of Veterinary Value Chain
↓
Reduced Bottlenecks and Transaction Costs
↓
New Value Proposition
↓
Digital Business Model

↓
Market Adoption and Commercialization

Through this methodology, the study moves beyond evaluating whether Kambing Light Vision can technically detect goat diseases. The central methodological focus is to determine whether and how AI changes the structure of veterinary service delivery and creates a potentially disruptive business model within the goat-farming ecosystem.

4.0 RESULTS AND DISCUSSION

AI-Based Transformation of Veterinary Service Delivery

The results indicate that Kambing Light Vision has the potential to transform veterinary service delivery from a predominantly reactive and veterinarian-dependent process into a digitally assisted, farmer-accessible service. The proposed system allows farmers to capture images of goats using smartphones, after which the image is processed through an AI-based Computer Vision system to identify potential health conditions. The system subsequently provides a prediction confidence score and AI-assisted care recommendations.

This finding is important from a business perspective because the primary value of the technology is not simply its ability to classify images (Faiz et al., 2024). Its greater value lies in shortening the distance between the emergence of a health problem and the availability of actionable information. Conventional veterinary services may require farmers to wait for veterinary assistance, whereas the proposed system provides an initial assessment directly at the farm level.

Thus, AI changes the role of technology from a passive information system into an active service-enabling mechanism. Farmers become participants in the first stage of the veterinary service process, while veterinarians can potentially focus their professional resources on cases that require further clinical assessment.

Reconfiguration of the Veterinary Value Chain

The results suggest that the most significant business implication of Kambing Light Vision is the potential reconfiguration of the veterinary value chain.

The conventional process can be represented as:

Farmer → Veterinary consultation → Clinical examination → Diagnosis → Treatment recommendation → Follow-up

The proposed AI-enabled process becomes:

Farmer → Image capture → AI detection → Confidence assessment → Preliminary recommendation → Veterinary referral → Follow-up

This represents a shift in the location of preliminary information processing. Instead of all initial assessment activities being concentrated within veterinary services, part of the process is transferred to the farm through a digital platform.

The proposal specifically identifies the system as a potential digital triage mechanism, enabling the screening of lighter and more severe cases before veterinary intervention. This creates the possibility of reducing bottlenecks in veterinary services while maintaining professional intervention for cases requiring clinical expertise.

The disruption, therefore, does not necessarily arise because AI replaces veterinarians. Rather, it emerges because AI reallocates activities across the value chain. This distinction is strategically important. Kambing Light Vision can function as an augmentation technology that allows farmers to obtain preliminary information while strengthening the efficiency of professional veterinary services.

From Technology Innovation to Value Proposition Innovation

The results further demonstrate that Kambing Light Vision creates a value proposition that differs from conventional livestock applications. Existing digital livestock systems may focus on production monitoring, animal identification, or IoT-based environmental monitoring (Shahab et al., 2024). The proposed platform combines disease detection, prediction confidence, and veterinary care recommendations within a single service flow.

This integration creates several dimensions of customer value. First, farmers receive faster access to preliminary health information. Second, they obtain a more structured basis for deciding whether an animal requires further professional attention. Third, veterinary clinics may obtain a digital screening mechanism that can improve case prioritization. Fourth, agribusiness organizations can potentially integrate the technology into their broader livestock-management systems.

Therefore, the value proposition moves from “AI detects disease” toward “AI enables faster and more accessible animal-health decision making.” This distinction strengthens the business relevance of the innovation because customers are more likely to pay for a service that solves an operational problem than for an algorithm alone.

Reduction of Transaction Costs and Operational Inefficiency

A major result of the proposed technology is its potential to reduce several transaction and operational costs associated with conventional veterinary services. The proposal identifies three major industry problems: limited veterinary personnel, relatively high clinical examination costs, and delays in disease detection.

The AI-enabled process potentially reduces these costs by providing preliminary assessment at the point of production (Yaiprasert & Hidayanto, 2024). Farmers do not necessarily need to immediately arrange a physical veterinary visit for every suspected health problem. At the same time, veterinary professionals can receive more structured information before conducting further examination.

The economic mechanism can therefore be represented as:

AI adoption → faster information → reduced uncertainty → faster decision making → lower transaction costs → improved operational efficiency

This is an important mechanism underlying the proposed value-chain disruption. The competitive advantage does not depend exclusively on AI accuracy but also on the economic consequences of faster and more accessible information.

Emergence of New Digital Business Opportunities

The results indicate that Kambing Light Vision has potential to create new revenue mechanisms within veterinary and livestock services. The proposal identifies three commercialization approaches, namely subscription-based SaaS, industrial licensing, and managed services for veterinary clinics.

These mechanisms transform the technology from a conventional software product into an ongoing service. The potential business structure can be conceptualized as follows:

Business Model	Target Customer	Value Offered
SaaS	Goat farmers	Continuous AI-based health support
Licensing	Cooperatives and agribusiness	Integration into organizational services
Managed service	Veterinary clinics	AI-assisted triage and service efficiency

This finding suggests that the disruptive potential of Kambing Light Vision extends beyond farmers. The technology can become an infrastructure layer for digital veterinary services, connecting farmers, veterinary professionals, cooperatives, and agribusiness organizations (Abbasi et al., 2022).

The scalability of these models is particularly important because software-based services can potentially serve additional users without requiring proportional increases in physical veterinary infrastructure.

Platform and Ecosystem Potential

The results also demonstrate the potential for Kambing Light Vision to evolve from an individual application into a broader digital livestock-health ecosystem. The proposed architecture is designed to integrate mobile applications, cloud and edge processing, dashboards, and IoT-based livestock monitoring.

This creates an opportunity for multiple actors to participate in the same digital ecosystem:

Farmers ↔ Kambing Light Vision ↔ Veterinarians ↔ Cooperatives ↔ Agribusiness

As more users and datasets become connected, the platform could generate additional value through data-driven services and integration with broader livestock-management systems (D'Anca et al., 2026). From a business perspective, this creates a potential shift from a product-centric model to an ecosystem-centric model. The competitive advantage would increasingly depend not only on the AI model but also on the network of users, veterinary knowledge, operational data, and institutional partnerships surrounding the platform.

Technology Readiness and Commercialization Potential

The results also show that the technology has progressed beyond a purely conceptual stage. Kambing Light Vision already has a prototype disease-detection system, preliminary testing, field data collection, and an initial reported accuracy of 70% using 300 goat disease images.

The development roadmap targets progressive movement from TRL 6 to TRL 9. The planned stages include AI model optimization, system integration, field testing, multi-user trials, business feasibility validation, and full industrial implementation.

This progression is relevant to the disruption argument because technological disruption requires more than proof of concept. It requires the technology to become sufficiently reliable, usable, scalable, and commercially deployable. The proposed roadmap therefore provides an important bridge between technological innovation and market innovation.

Discussion of the Disruptive Innovation Mechanism

Taken together, the results suggest that Kambing Light Vision can be understood as a form of value-chain disruption rather than merely business model innovation.

The mechanism can be summarized as:

AI capability → decentralized health assessment → faster information flow → veterinary triage → reduced transaction costs → new service configuration → new revenue mechanisms → digital veterinary ecosystem

The disruption occurs at several levels. At the farmer level, access to preliminary veterinary information becomes faster and more accessible. At the veterinary level, AI can support triage and allow professional resources to be allocated more efficiently. At the industry level, agribusiness organizations can integrate AI health services into existing livestock-management systems. At the business level, recurring SaaS, licensing, and managed-service models create new mechanisms for value capture.

Consequently, the central contribution of Kambing Light Vision is not simply technological automation. Its disruptive potential comes from changing who performs the initial health-assessment activity, how information moves through the veterinary value chain, and how veterinary services can be packaged and commercialized.

Implications for Sustainable Business Transformation

The proposed transformation also has implications for sustainable livestock business. Earlier disease identification can potentially reduce livestock mortality, prevent unnecessary treatment, and improve animal welfare. The proposal identifies these environmental and operational benefits as indirect contributions of the technology.

This means that business value and sustainability value can potentially develop simultaneously:

Better disease detection → healthier livestock → lower losses → more efficient resource use → improved farm economics → more sustainable livestock production

Therefore, Kambing Light Vision represents a potential example of how AI can generate economic, operational, and sustainability value simultaneously.

Overall Finding

Overall, the results support the argument that AI-based goat health management has the potential to disrupt the veterinary value chain by decentralizing preliminary health assessment, reducing information and service bottlenecks, creating new value propositions, and enabling scalable digital business models.

The most important theoretical implication is that the disruptive effect of AI should not be evaluated only through algorithmic performance. Its broader impact emerges when technological capability is translated into changes in value-chain configuration and mechanisms of value creation and capture.

In this context, Kambing Light Vision represents a transition:

from AI as a diagnostic tool → to AI as a veterinary service infrastructure → to AI as a driver of value-chain disruption.

This positioning provides a stronger business interpretation of the technology than viewing it solely as an AI-based disease-classification system.

5.0 CONCLUSION

Conclusion

This study concludes that AI-based goat health management has the potential to disrupt the veterinary value chain by changing how animal-health information is generated, processed, delivered, and commercialized. Kambing Light Vision extends the role of Computer Vision beyond disease classification by integrating disease detection, prediction confidence, and AI-assisted veterinary care recommendations into a digital service platform.

The main contribution of the technology is therefore not only technological efficiency but the reconfiguration of veterinary service delivery. By enabling farmers to conduct preliminary health assessment through mobile devices, the platform can reduce information and service bottlenecks while allowing veterinary professionals to concentrate on cases requiring further clinical intervention. The proposed SaaS, licensing, and managed-service approaches further demonstrate the potential to convert AI capability into scalable business value.

Overall, Kambing Light Vision demonstrates a transition from AI as a diagnostic tool toward AI as digital veterinary service infrastructure, creating opportunities for new value propositions, business models, and ecosystem relationships within smart goat farming.

Implications

Theoretical Implications

This study contributes to the literature by connecting AI adoption, digital service transformation, value-chain disruption, and business value creation. Rather than examining AI solely from an algorithmic perspective, the study positions AI as a mechanism capable of reallocating activities and transforming relationships among farmers, veterinarians, technology providers, and agribusiness organizations.

The findings suggest that the disruptive potential of AI should be evaluated not only through prediction accuracy but also through its ability to change the configuration of value creation and value delivery.

Managerial Implications

For livestock businesses, Kambing Light Vision provides an opportunity to develop more accessible and scalable animal-health services. Farmers can obtain preliminary information more rapidly, while veterinary clinics and agribusiness organizations can potentially use AI for digital triage and service optimization. The platform's proposed integration with IoT and livestock-management systems also provides opportunities to expand services beyond disease detection.

For technology providers, the findings indicate that commercial value may be greater when AI is offered as a continuous service rather than a standalone technological product, particularly through subscription, licensing, and managed-service mechanisms.

Limitations

This study has several limitations. First, the technology is still in the development and industrial-validation stage. Although the initial prototype achieved 70% accuracy using 300 goat disease images, the dataset remains relatively limited for representing the diversity of disease conditions, breeds, ages, environmental conditions, and image-capture situations found in commercial livestock production.

Second, the study focuses specifically on goats. Consequently, the findings cannot automatically be generalized to other livestock species without additional validation. Third, the proposed business implications are primarily based on the technology-development context and planned commercialization pathways. The proposal identifies SaaS, licensing, and managed services as potential models, but comprehensive evidence regarding willingness to pay, customer acquisition cost, long-term retention, and actual market performance is not yet available.

Finally, the disruptive impact of the platform cannot be fully established until broader multi-user and industrial implementation is completed. The development roadmap itself anticipates further validation through operational trials, multi-user testing, business feasibility assessment, and commercialization.

Recommendations

Several recommendations emerge from the findings. First, future implementation should prioritize expansion and diversification of the field dataset through collaboration with multiple goat farms. This is important for improving model robustness under different environmental and livestock conditions. The proposed technology roadmap already identifies multi-farm collaboration and data augmentation as strategies for addressing data limitations.

Second, Kambing Light Vision should be positioned as an AI-assisted veterinary decision-support service rather than a replacement for veterinarians. Clear referral mechanisms should be incorporated for cases requiring professional clinical examination.

Third, commercialization should initially focus on customer segments with clear economic value, particularly commercial goat farms, cooperatives, veterinary clinics, and agribusiness integrators. The SaaS, licensing, and managed-service models can then be tested to determine which configuration generates the strongest customer value and sustainable revenue.

Fourth, usability should remain a central development priority. Because the target users include farmers with different levels of technological literacy, simple interfaces, short training, and clear recommendations are essential. The proposal similarly identifies simple UI design and digital guidance as mitigation strategies for low user adoption.

Future Research

Future research should move from conceptual and prototype-level analysis toward empirical evaluation of the actual disruptive effects of AI on the veterinary value chain. First, longitudinal studies should examine whether Kambing Light Vision produces measurable improvements in diagnostic response time, veterinary-service efficiency, treatment decisions, livestock health outcomes, and farm profitability.

Second, future studies should investigate the economic feasibility and willingness to pay of different customer segments. Comparative analysis of SaaS, licensing, and managed-service models could determine which business configuration provides the strongest combination of customer value, scalability, and revenue sustainability.

Third, future research should examine the development of a broader digital veterinary ecosystem, connecting AI disease detection with IoT monitoring, veterinary consultation, livestock production records, and farm-management platforms.

Fourth, comparative studies across livestock species could investigate whether the value-chain disruption mechanism identified in goat farming can be transferred to cattle, sheep, poultry, and other livestock sectors. Finally, future research should investigate whether increasing AI adoption creates a broader industry-level transformation, including changes in the roles of veterinarians, farmers, technology providers, cooperatives, and

agribusiness firms. Such research would provide stronger empirical evidence for the proposition that AI can move beyond incremental technological improvement toward genuine veterinary value-chain disruption.

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