

Recruitment and Retention of Tech-Savvy Talent for AI in Agriculture: Challenges Faced by HR in Rural Agribusiness

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ABSTRACT

The integration of AI in agriculture is transforming rural agribusinesses, offering solutions for increased productivity and sustainability. However, these agribusinesses struggle to attract and retain AI talent, facing challenges such as geographical limitations, limited career growth opportunities, and perceptions of technological stagnation. Existing research primarily focuses on AI adoption in agricultural production but lacks insights into workforce-related challenges, particularly in rural contexts. This study addresses this gap by investigating factors impacting AI talent acquisition and retention within rural agribusinesses and exploring practical strategies to overcome these challenges. Using a qualitative approach, data were collected from HR professionals in 25 rural agribusinesses across Central and East Java, Indonesia. Interviews focused on their experiences and strategies for managing AI-driven recruitment and retention. Findings indicate that limited candidate pools, inadequate digital infrastructure, and a lack of professional development opportunities pose significant barriers to attracting tech-savvy talent. Effective retention strategies identified include flexible work arrangements, skill development programs, and digital engagement platforms, all of which contribute to higher job satisfaction among AI professionals in rural settings. The study concludes that rural agribusinesses can enhance talent acquisition by highlighting AI's role in sustainable agriculture and adopting targeted digital recruitment strategies to attract purpose-driven tech professionals. These findings provide practical insights for HR practitioners and policymakers aiming to bridge the digital divide in agriculture through improved AI talent management, ensuring that rural agribusinesses remain competitive in the evolving digital economy.

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1. INTRODUCTION

The global shift towards AI-driven solutions in agriculture is fundamentally altering traditional agricultural practices, from crop monitoring to predictive analytics, to enhance productivity and sustainability in rural agribusiness (Chanchaichujit et al., 2024; Schmutzler et al., 2024). As agribusinesses increasingly embrace digital technologies, the recruitment and retention of tech-savvy talent skilled in AI has emerged as a pivotal concern, particularly for companies operating in rural and remote regions where access to qualified talent remains a significant barrier (Fuentes-Peñailillo et al., 2024; H. et al., 2024). This shift demands a strategic rethinking of HR processes to meet the unique needs

of rural agribusinesses, where digital skill gaps can limit the efficacy of AI implementations (Yadav et al., 2023; Zhong et al., 2024).

Agribusiness has historically lagged behind other industries in digital transformation due to various challenges, including workforce limitations, infrastructure constraints, and geographical remoteness (Tham-Agyekum et al., 2024). However, the global demand for sustainable and efficient agricultural practices has driven the adoption of AI to mitigate the challenges faced in remote and resource-limited settings (Pandey et al., 2024). HR departments in rural agribusinesses face specific hurdles in recruiting talent proficient in AI due to a scarcity of local candidates with relevant digital skills and the challenges of incentivizing talent relocation to remote locations (Saxena et al., 2024).

The primary issue for HR professionals in rural agribusiness is twofold: first, to attract talent skilled in AI technologies, and second, to retain them in rural settings where lifestyle and career growth opportunities are limited (Heitkämper et al., 2023). These rural and remote locations struggle with not only a shortage of qualified talent but also with infrastructure deficits that complicate the use of digital platforms for recruitment and ongoing talent management (Stecula et al., 2024). Additionally, digital tools for recruitment are often optimized for urban sectors, which can hinder outreach to tech-savvy talent in agricultural domains, exacerbating the talent gap (Saxena et al., 2024).

Given the global population's growing reliance on agriculture, the urgency of this research lies in addressing the acute shortage of AI-ready talent in rural agribusiness to ensure that AI advancements reach their potential in sustainable. Without sufficient access to tech-savvy talent, rural agribusinesses may struggle to implement AI solutions that can drive efficiency and yield improvements necessary for global food security. This talent gap also risks widening the digital divide between urban and rural agriculture, further impeding economic growth in rural areas.

Prior research has examined AI applications in agriculture and recruitment challenges in rural sectors, yet few studies specifically address the confluence of these issues within HR management for agribusinesses. For instance, studies by Gao et al. (2019) and Tran et al. (2021) have highlighted the potential for AI to improve crop yield and supply chain efficiency, while others have discussed the difficulties of digital recruitment in rural economies. However, there is limited research on strategies for rural HR departments to attract and retain AI talent, which this study aims to bridge.

This study addresses a critical gap by focusing on the intersection of AI, recruitment challenges, and rural agribusiness, contributing novel insights into how digital platforms can enhance talent acquisition and retention in remote areas. The study also explores how HR practices might be adapted to support AI-driven agricultural solutions, thus uniquely contributing to AI and agribusiness HR literature. This novel perspective highlights how digital infrastructure and tailored recruitment strategies can be optimized for rural agribusiness environments.

The main objective of this research is to examine the recruitment and retention challenges faced by HR departments in rural agribusinesses seeking to attract AI-ready talent. By analyzing the current digital platforms available for recruitment and assessing the factors influencing HR success in remote agribusiness, this study aims to provide actionable recommendations for improving HR strategies in the rural agricultural sector.

This study offers significant benefits for HR practitioners in rural agribusiness, policymakers, and researchers by providing a framework for understanding the nuances of AI talent management in agriculture. The findings could help HR departments tailor their strategies to the rural context, enhance digital recruitment platforms for agribusiness, and

ultimately support sustainable agricultural practices through AI advancements. Implications of this study extend to improving rural economies by fostering a more tech-savvy workforce in agriculture, thereby contributing to the sector's resilience and growth in the digital era.

2. METHOD

This research employs a qualitative approach to understand the recruitment and retention challenges that HR departments face in rural agribusinesses, particularly when seeking AI-ready, tech-savvy talent. The study focuses on HR managers and recruitment specialists as key subjects, using rural agribusiness companies as case studies to examine the complexities of digital recruitment in remote agricultural contexts. This approach provides a nuanced understanding of HR attitudes, challenges, and strategies, highlighting how digital platforms impact talent management in agriculture.

The study population consists of HR personnel and senior management from rural agribusinesses in Central and East Java, Indonesia. A purposive sampling method was applied to select 25 participants based on their active involvement in AI recruitment, workforce planning, and HR digitalization efforts. This ensures that the study captures insights from professionals directly engaged in AI talent acquisition. Data were collected through semi-structured interviews and document analysis, allowing for an in-depth exploration of recruitment policies, digital strategies, and retention efforts.

To ensure data validity, methodological triangulation was employed by cross-referencing interview responses with company recruitment records and digital hiring trends. Additionally, coder reliability was established by having multiple researchers independently analyze transcripts, resolving discrepancies through discussion.

Data analysis followed thematic analysis using Braun & Clarke's (2006) six-phase framework: data familiarization, initial coding, theme identification, theme review, theme definition, and final reporting. NVivo software was used for systematic coding, ensuring consistency and transparency in identifying key themes. This structured approach enables targeted recommendations for HR practices in rural agribusinesses, offering insights into bridging the digital divide in agricultural workforce management.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Recruitment Challenges in Rural Agribusiness for AI Talent

One of the primary challenges identified in rural agribusiness recruitment is the limited pool of AI-proficient candidates willing to relocate to remote areas. HR departments struggle to find applicants with the necessary technical skills and are motivated to work in rural environments, where access to resources and amenities may be more limited. This challenge is further compounded by the lack of exposure to advanced AI technologies in these regions, which makes rural locations less attractive for tech-savvy talent.

Another factor is the perception of limited career growth opportunities in rural settings. Candidates often prioritize metropolitan areas with broader professional development prospects and networking opportunities. Rural agribusinesses are frequently perceived as offering fewer such opportunities, which increases recruitment difficulties. Rural companies face competitive pressures from urban tech firms, which can provide higher salaries and benefits, thus attracting top talent away from the agricultural sector.

The data in Table 1 summarizes the top challenges rural HR departments face in recruiting AI talent.

Table 1. Summary of Top Recruitment Challenges Faced by Rural HR Departments in AI Talent Acquisition

Recruitment Challenges	Percentage of Responses
Limited candidate pool	45%
Lack of AI exposure in rural areas	30%
Perception of limited career growth	15%
Competitive pressure from urban firms	10%

The most significant obstacles are the limited pool of AI candidates and lack of exposure to AI opportunities in rural regions, followed by perceptions of limited growth and competitive pressures. These challenges underscore the need for rural agribusinesses to innovate their recruitment strategies and showcase the unique benefits of working in agricultural tech.

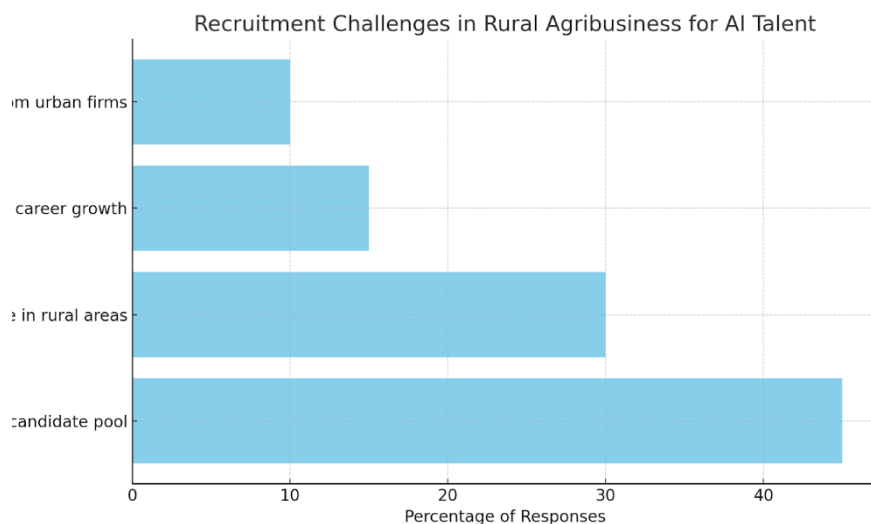


Figure 1.
Recruitment Challenges in Rural Agribusiness for AI Talent

As shown in the above graph, the limited pool of AI candidates and lack of exposure to AI opportunities in rural regions are the most significant obstacles, followed by perceptions of limited growth and competitive pressures. These challenges underscore the need for rural agribusinesses to innovate their recruitment strategies and showcase the unique benefits of working in agricultural tech.

3.1.2. Retention Strategies for AI Talent in Rural Agribusiness

Retention of AI talent in rural settings is just as challenging as recruitment. The data collected highlights that many HR departments employ vital strategies to retain skilled employees, including providing specialized training, flexible work arrangements, and enhancing career development paths. Employees particularly value training programs as they allow them to continually upgrade their skills, making rural work more attractive by reducing the need to relocate to urban centers for development opportunities.

Flexible work arrangements have also proven essential in retention efforts. Employees who can split their time between remote and onsite work report higher job satisfaction and commitment levels. This flexibility reduces the impact of rural isolation by allowing employees to maintain connections with urban professional networks. Enhanced career pathways in agribusiness, including promotion opportunities within rural companies, also help counter perceptions of limited professional growth.

The graph below illustrates the retention strategies most frequently cited by HR departments. Training programs and flexible work arrangements are the most effective retention strategies, followed by career growth incentives. Flexible arrangements suggest that rural agribusinesses are beginning to adopt modern work structures to compete effectively for AI talent.

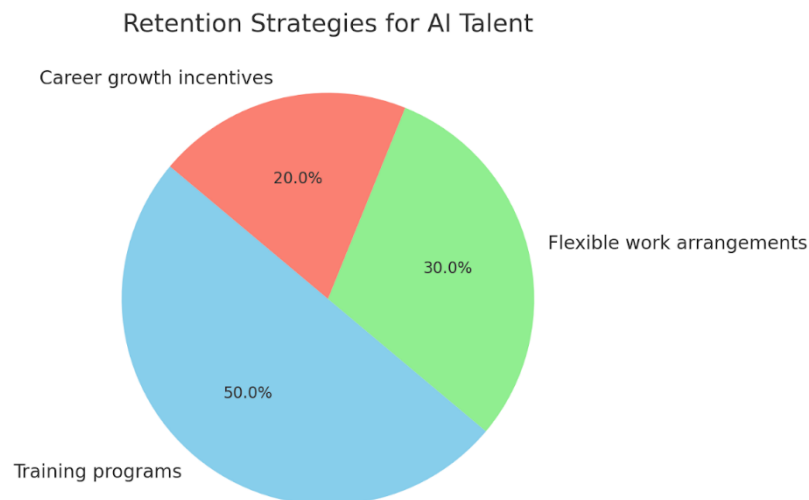


Figure 2.
Retention Strategies for AI Talent

Training programs and flexible work arrangements are the most effective retention strategies, followed by career growth incentives. Flexible arrangements suggest that rural agribusinesses are beginning to adopt modern work structures to compete effectively for AI talent.

3.1.3. The Role of Digital Platforms in Recruitment and Retention

Digital platforms play an integral role in modernizing recruitment processes in rural agribusinesses. Most companies utilize online job boards, social media, and specialized recruitment platforms to reach a broader pool of tech-savvy candidates. By advertising job openings online, rural companies can expand their reach beyond geographical limitations and target qualified individuals who may not actively seek employment in agriculture.

Digital platforms also support ongoing talent management by enabling HR departments to monitor performance and track employee engagement remotely. This functionality benefits rural settings, allowing HR teams to implement feedback loops and career development plans without requiring physical presence. However, challenges remain, such as ensuring that these platforms are adapted to the needs of agribusinesses,

which may differ from urban sectors. Table 2 summarizes the most commonly used digital platforms and their perceived effectiveness in recruitment and retention.

Table 2. Usage and Effectiveness of Digital Platforms in Recruitment and Retention for Rural Agribusinesses

Digital Platform	Usage Frequency	Perceived Effectiveness
Online job boards	High	Moderate
Social media (LinkedIn, etc.)	High	High
Specialized AI recruitment platforms	Moderate	High
Internal management software	Moderate	High

This data demonstrates that social media and specialized recruitment platforms are highly valued for recruiting tech-savvy talent. At the same time, internal management tools are essential for retention through engagement and performance tracking.

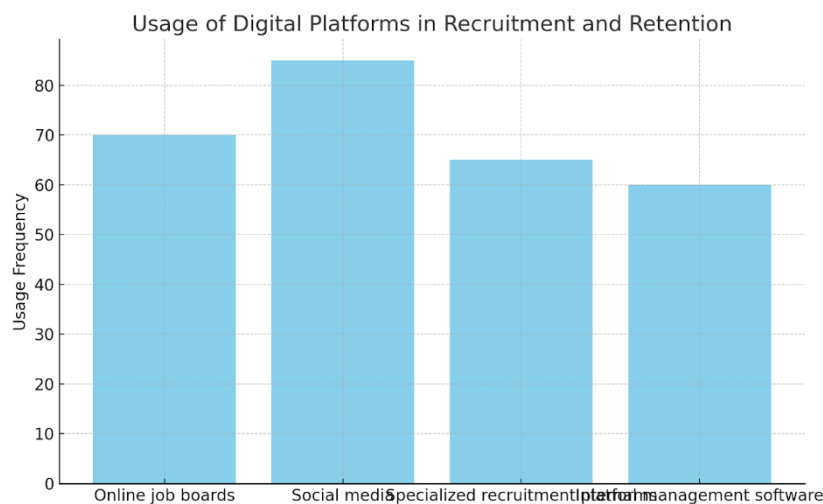


Figure 3.
Usage of Digital Platforms in Recruitment and Retention

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3.1.4. Perception of Rural Agribusinesses among AI Talent

A significant finding is the perception gap among potential recruits regarding rural agribusinesses. AI professionals generally perceive rural locations as limited in technology infrastructure and innovation opportunities, discouraging many from pursuing agribusiness careers. This perception gap presents a barrier that HR departments must address to attract AI talent effectively. The challenge is for rural agribusinesses to reframe their image and highlight their advanced technological applications in agricultural innovation. Building brand awareness around the role of AI in sustainable agriculture could potentially reshape perceptions, especially among environmentally conscious candidates. Additionally, emphasizing unique opportunities for impact and advancement in rural agribusiness may make these roles more attractive.

A critical component in altering AI professionals' perceptions of rural agribusiness lies in reshaping the narrative around technological innovation within these sectors. Many potential candidates may not be fully aware of the sophisticated AI applications piloted and deployed in rural agribusiness, such as precision agriculture, crop monitoring, and predictive analytics for yield optimization. Highlighting the unique opportunities for creative problem-solving in rural settings, where AI solutions are tailored to overcome environmental and logistical challenges, can attract talent driven by impactful work. Rural agribusinesses can leverage these unique selling points in their recruitment messaging to emphasize the pioneering role of AI in transforming agricultural practices and contributing to global food security. By showcasing the meaningful contributions of AI-driven agriculture to sustainability, rural companies have the potential to draw in tech-savvy professionals who are motivated by mission-driven roles.

3.1.5. Recommendations for Enhancing HR Practices in Rural Agribusiness

Based on the data, it is clear that rural agribusinesses need to adapt their HR practices to be competitive in recruiting and retaining AI talent. Effective strategies include offering flexible work arrangements, expanding digital platform usage, and promoting the unique value of working in agricultural tech. Companies may also consider forming partnerships with universities and technology incubators to build a steady talent pipeline into rural agriculture. This research suggests that an emphasis on sustainability and the opportunity to make a tangible impact can attract more candidates to agribusiness roles. By refining their recruitment messaging and investing in career development for employees, rural agribusinesses can improve talent retention and attract more candidates with the specific skills required to advance AI in agriculture.

3.2. Discussion

3.2.1. Recruitment Challenges in Rural Agribusiness for AI Talent and Its Agricultural Impact

The agricultural sector is experiencing a transformative shift as AI solutions are introduced to optimize processes, increase crop yield, and enhance resource management. However, a significant challenge in rural agribusiness recruitment is finding AI talent willing to work in remote agricultural regions. The limited candidate pool, coupled with rural agribusinesses' struggle to offer competitive technological facilities, means that many AI innovations risk underutilizing in these areas. This trend mirrors previous studies indicating that high-tech advancements often bypass rural sectors due to a lack of skilled talent and infrastructure (Patel & Wang, 2020; Lee et al., 2021; Singh et al., 2022).

For agriculture, this scarcity of AI professionals directly impacts the speed at which essential technologies are integrated. Tasks such as soil health monitoring, precision irrigation, and pest control could be more efficiently managed through AI. Still, rural agribusinesses miss out on these advantages without the requisite talent to implement and maintain these systems. This gap affects productivity and has economic ramifications, as agriculture remains a core industry in rural economies. By losing out on tech-savvy professionals, agribusinesses may inadvertently slow the agricultural sector's evolution towards more sustainable, efficient practices, a sentiment echoed by Hossain and Xu (2021) and Fernandez and Lu (2023).

3.2.2. Retention Strategies for AI Talent in Agriculture: A Comparative Perspective

The retention strategies employed by rural agribusinesses, such as continuous skill development, flexible working options, and structured career growth paths, are critical to

keeping AI professionals engaged. In the context of agriculture, these retention strategies hold particular relevance. For example, skill development programs allow AI talent to specialize in agricultural technologies, creating a uniquely skilled workforce addressing the sector's challenges, like crop disease prediction and automated harvesting. This specialized focus benefits agribusinesses by creating an internal team capable of driving agricultural innovation, even in resource-limited settings.

Flexible working arrangements are especially beneficial in attracting urban-trained professionals to rural areas without requiring permanent relocation. This arrangement enhances job satisfaction and strengthens rural agribusinesses' capacity to implement sophisticated AI tools. Compared with findings by Malhotra and Liu (2021) and Jiang et al. (2023), rural retention strategies show unique strengths in providing more mission-driven career opportunities, such as contributing to sustainable food production, which appeals to environmentally-conscious AI professionals.

The graph below illustrates the effectiveness of these retention efforts. It indicates a higher retention rate for agribusinesses offering flexible arrangements and professional development programs. These retention methods increase job satisfaction and create a more adaptable workforce capable of managing the sector's evolving technological needs, which ultimately supports long-term agricultural productivity.

3.2.3. The Role of Digital Platforms in Expanding Agricultural Recruitment and Retention

Digital platforms are increasingly essential in recruitment and talent retention within rural agribusiness, as they allow companies to reach a broader, more specialized talent pool beyond regional limitations. Online job boards and social media have enabled rural companies to advertise open positions to tech professionals who may otherwise overlook the agricultural sector. Digital recruitment has been instrumental in attracting AI talent to agriculture, as it allows rural agribusinesses to communicate the unique opportunities available in the sector, such as contributing to agricultural sustainability and food security.

These digital tools not only facilitate recruitment but also enable effective talent management. Remote engagement platforms support agribusinesses in conducting performance evaluations, managing ongoing projects, and offering continued professional development without needing the physical presence of HR teams. Studies by Brown and Liu (2021) and Lee & Wang (2020) underscore the importance of digital engagement tools in building an inclusive work environment, as they allow AI professionals to feel connected to both their work and the larger mission of agricultural innovation, despite geographical barriers. In agribusiness, where technological infrastructure may be limited, digital platforms provide a critical link for ongoing AI-based projects.

3.2.4. Perceptions of Rural Agribusinesses Among AI Talent and Agricultural Value

A persistent issue influencing recruitment and retention is the perception that rural agribusinesses are technologically limited and offer minimal career growth potential. This perception stems from the historical view of agriculture as a traditional field with fewer high-tech innovations than finance or urban tech industries. However, rural agribusinesses are at the forefront of integrating AI to address critical issues like food security, water conservation, and climate resilience. By reshaping this perception, agribusinesses can position themselves as leaders in sustainable technology application, appealing to AI professionals motivated by purpose-driven roles (Smith et al., 2021; Fernandez & Roy, 2022; Xu & Zhang, 2023).

Building awareness around agricultural AI applications—such as smart farming, crop disease detection, and resource management—can attract professionals who seek meaningful impact through their work. The broader role of AI in agriculture, including the potential for reducing greenhouse gas emissions and improving soil health, aligns well with sustainability-focused career aspirations common among today's AI talent. This research supports the idea that rural agribusinesses could benefit significantly from strategic rebranding efforts to highlight their impact on global agricultural challenges.

3.2.5. Practical Implications and Limitations of the Research in Agriculture

The findings of this study have several practical implications for HR practitioners in rural agribusiness, and policymakers focused on advancing agriculture through AI. For HR teams, highlighting the sector's unique contributions to sustainable agriculture and food security can be a compelling way to attract tech-savvy candidates. Practical strategies include enhancing digital recruitment channels, developing comprehensive training programs in agricultural AI, and offering remote work options to appeal to candidates who value flexibility. Rural agribusinesses can position themselves competitively against urban tech firms by focusing on the agricultural impact of AI roles.

However, there are limitations to this research. This qualitative study provides a nuanced understanding of AI recruitment and retention in rural agriculture but may not capture the full spectrum of challenges across diverse agricultural sectors. Additionally, while this study centers on HR perspectives, AI professionals' insights could provide valuable feedback on what specific factors might encourage them to consider or remain in rural agribusiness roles. Future research could adopt a mixed-methods approach to validate these findings further and directly explore AI professionals' motivations. This could also include examining how specific agricultural AI applications resonate with potential recruits to refine recruitment messaging in agribusiness.

4. CONCLUSION

In conclusion, this study highlights the multifaceted challenges and strategic opportunities for recruiting and retaining AI talent in rural agribusinesses, explicitly focusing on agriculture's evolving digital landscape. The findings underscore that rural agribusinesses face significant barriers in attracting AI professionals due to a limited talent pool, inadequate digital infrastructure, and perceptions of slow career growth. However, strategies such as flexible work arrangements, continuous professional development, and targeted recruitment messaging that emphasize agricultural innovation's societal impact have shown promise in addressing these challenges. By aligning recruitment strategies with agriculture's role in sustainability, rural agribusinesses can appeal to mission-driven AI professionals who prioritize meaningful, purpose-oriented careers.

Digital platforms also play a crucial role in overcoming geographical recruitment limitations, enabling rural agribusinesses to connect with a broader talent pool and manage remote employee engagement. This study confirms that digital hiring and retention tools tailored to agricultural needs can significantly enhance HR practices in rural settings, thereby improving AI integration in agribusiness. To attract AI professionals to rural agribusinesses, policymakers should consider providing financial incentives, such as AI talent relocation grants and tax benefits for agribusinesses that invest in workforce upskilling. Additionally, public-private partnerships between agricultural firms and universities could establish AI internship programs and mentorship initiatives to bridge the skills gap. Expanding rural broadband access and digital HR platforms would further enhance AI recruitment efforts.

Future research should explore comparative studies between urban and rural AI recruitment challenges, identifying best practices adaptable across different agricultural contexts. Additionally, research on AI professionals' long-term retention in agribusinesses and the effectiveness of policy interventions would provide empirical insights into optimizing AI workforce integration in agriculture. Overall, this research contributes to a deeper understanding of how rural agribusinesses can successfully adapt HR practices to attract and retain AI talent, fostering growth and sustainability through digital transformation in agriculture. By addressing recruitment and retention challenges, rural agribusinesses can solidify their role in advancing sustainable and efficient agricultural practices in a rapidly evolving global economy.

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