

Leveraging Policy Innovation and Collaboration for Sustainable Growth in Agribusiness and the Green Economy

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Abstract

This study examines the role of transitioning to a green economy in the agribusiness sector, encompassing related sectors such as agriculture, fisheries, livestock, forestry, agro-processing industries, and renewable energy. The primary focus is on exploring policies and innovations that support the implementation of a green economy in agribusiness. Data were collected through surveys assessing policies, the adoption of eco-friendly technologies, and their impact on the sustainability of the agribusiness sector. Data analysis, conducted using NVivo 14, identified key themes such as policies promoting green technology adoption, resource efficiency, and carbon emission reduction. The findings reveal that policies supporting green technology and fostering cross-sector collaboration significantly enhance the efficiency and sustainability of agribusiness. These findings underscore the critical role of policy and sectoral collaboration in accelerating the transition to a green economy in agribusiness. This study contributes to understanding how policies and innovations can drive agribusiness transformation toward a sustainable green economy.

Keywords: Green Economy; Agribusiness; Green Technology; Innovation; Qualitative Analysis

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Introduction

The traditional economic growth model, while beneficial in many respects, has led to significant environmental degradation due to its reliance on human, technological, and natural resources (Brears, 2023). This model has increasingly become unsustainable in the face of growing global challenges such as climate change, urbanization, and rising social inequality (Samad, 2022). These challenges underscore the urgent need for a shift toward a green economy—one that prioritizes sustainability, environmental protection, and social well-being (Samad, Ishaq, Setiyadi, & Utama, 2023). In addition, the integration of green economy principles with human resource behavior has been identified as an essential factor in reducing the discrepancy gap between economic development and sustainable environmental management (Setiyadi & Samad, 2025).

The green economy is viewed as a viable solution to this shift, but its successful implementation requires effective policies and practices that foster sustainable growth while addressing environmental harm. In this context, agribusiness plays a pivotal role. As a sector that is closely tied to natural resources, agribusiness can significantly contribute to the green economy by integrating renewable resources into sustainable agricultural practices. Innovations such as biomass utilization for green hydrogen production (Dasappa et al., 2024) and climate-smart agriculture (Essaber, 2023) have the

potential to reduce carbon emissions, enhance resource efficiency, and improve agricultural productivity. These practices align with the global need for a transition to a more environmentally conscious economic model. Furthermore, the effectiveness of policies and regulations in strengthening food security and agribusiness sustainability through strategic human resource management has also been emphasized in recent studies using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach (Samad, 2025).

The motivation behind this study is to explore how agribusiness practices and policies can support the green economy transition, specifically focusing on their role in fostering sustainability and mitigating climate change impacts. This study seeks to answer the question: How do policies and innovations in agribusiness support the transition to a green economy? The research investigates the integration of sustainability principles, such as climate-smart agriculture, and how they influence resource efficiency, carbon emission reduction, and sector competitiveness. Leadership and organizational behavior are also important dimensions in achieving sustainable transformation, as transformational leadership has been shown to mediate work stress and motivation in improving employee performance and organizational effectiveness (Fitriani, Soemartono, & Marwan, 2025).

This research is crucial as it fills a gap in understanding how agribusiness can contribute to the Sustainable Development Goals (SDGs) by promoting eco-friendly practices. For instance, practices like zero tillage help reduce greenhouse gas emissions and are directly tied to sustainable agricultural development (Schmitz et al., 2022). Moreover, the integration of Environmental, Social, and Governance (ESG) principles within agribusiness strategies, particularly in Central Asia, plays a key role in reducing environmental impacts while fostering positive relationships with stakeholders (Popkova & Sergi, 2023). The alignment between green economy implementation, organizational behavior, and human resource capacity development is increasingly recognized as a critical determinant of sustainable development success (Setiyadi & Samad, 2025).

By focusing on policy interventions, technological innovations, and cross-sector collaboration, this study will clarify how agribusiness can accelerate the transition to a green economy. The results will contribute to the broader literature on sustainable agricultural practices, offering insights that can inform future policy development and the implementation of green economy strategies within agribusiness. Additionally, strengthening leadership quality, employee motivation, and regulatory frameworks will further support sustainable agribusiness transformation and resilience in

achieving long-term environmental and economic sustainability (Fitriani et al., 2025; Samad, 2025).

LITERATURE REVIEW

The role of agribusiness in fostering a green economy is increasingly recognized as essential for sustainable agricultural development and environmental stewardship. To ground this study in theory, this review engages with key concepts such as sustainable development, circular economy, green economy, and corporate social responsibility (CSR), as well as recent studies that highlight the ongoing transformation of agribusiness toward sustainability. Despite the growing recognition of agribusiness's role, there remains a gap in understanding how specific policies and technological innovations in agribusiness directly contribute to achieving green economy objectives, particularly in the context of resource efficiency and carbon emission reduction. This study seeks to fill this gap by exploring these dynamics in detail.

Theoretical Foundations: Sustainable Development and Green Economy

The concept of sustainable development has long been central to discussions about the future of agriculture and agribusiness. According to Brundtland (1987), sustainable development must balance economic, social, and environmental dimensions to meet the needs of present and future generations. This principle underpins the green economy framework, which focuses on achieving economic growth through

environmentally friendly practices, reducing carbon footprints, and promoting resource efficiency (Oncel, 2023).

A critical area of focus in the green economy is how agribusiness can integrate sustainable practices into its operations. The circular economy theory (Geissdoerfer et al., 2017) further informs this shift by emphasizing the reuse of resources, waste minimization, and closed-loop systems. Recent studies have highlighted the potential of agribusiness to contribute to circular economy goals, especially in the areas of biomass utilization and green hydrogen production, as evidenced by Dasappa et al. (2024), who highlight how biomass gasification provides a pathway for green hydrogen production with a negative carbon footprint.

Agribusiness and Sustainable Agriculture Practices

Sustainable agricultural practices, such as climate-smart agriculture, are critical to agribusiness's transition toward the green economy. As noted by Essaber (2023), climate-smart agriculture aims to enhance productivity while promoting sustainability and preserving natural resources. However, there remains a gap in understanding the specific policies that support the adoption of these practices and the role of technological innovations in scaling their impact. This study addresses this gap by exploring how policy frameworks in agribusiness encourage climate-smart practices.

Additionally, the concept of eco-efficiency (Huppes & Ishikawa, 2009) is crucial in understanding the role of agribusiness in promoting sustainability. Recent studies such as Schmitz et al. (2022) provide evidence of eco-efficient practices like zero tillage, which help reduce greenhouse gas emissions and sequester carbon in soil. However, research is needed to identify which policies most effectively drive the adoption of such practices across different regions and sectors.

Urban Agriculture and Social Responsibility

Urban agriculture, an emerging practice in cities worldwide, offers an innovative solution to food security challenges. According to O'Hara (2024), urban agriculture links local food systems with the broader economy, contributing to both sustainability and equity. Urban farming practices also support carbon footprint reduction and foster stronger relationships between humans and nature, aligning with the sustainable development goals (SDGs). Despite these promising developments, there is insufficient understanding of how agribusiness can effectively integrate these practices within urban economies. This study contributes to filling this gap by examining the role of urban agriculture in the broader green economy.

Moreover, the integration of corporate social responsibility (CSR) in agribusiness strategies is an increasingly important area of research. Agripino, Marac, & Dias (2023) argue that aligning

business strategies with social and environmental responsibilities enables agribusinesses to minimize environmental damage and build stronger relationships with stakeholders. However, studies on how agribusinesses are implementing CSR in the context of a green economy remain limited. This research explores these dynamics, focusing on how agribusiness can use CSR to drive sustainability and foster equitable development.

Green Economy as a Pillar of Global Sustainability

The green economy has gained global recognition as a fundamental element in achieving the Sustainable Development Goals (SDGs) (Oncel, 2023). As highlighted by Schmitz et al. (2022), practices such as zero tillage contribute to reducing agricultural emissions and sequestering carbon in soil. These practices are essential in the global effort to combat climate change while promoting sustainable agricultural growth.

Moreover, hydrogen technology is a critical part of the green economy transition, with significant potential for reducing carbon emissions in energy production. As Goel (2024) notes, enhancing workforce skills and adapting to new technologies like hydrogen energy are key to driving the green economy forward. However, the gap in literature lies in how these technologies are integrated into the agribusiness sector, and how policies can promote their widespread adoption. This study

explores these themes and their implications for policy.

Scope of Agribusiness in the Agricultural Value Chain

Agribusiness is a key player in the entire agricultural value chain, from production to processing and distribution. As highlighted by Schmitz et al. (2022), large corporations and small-medium enterprises (SMEs) contribute to the sustainability of the agricultural industry. The global value chain (GVC) approach (Gereffi, 1994) emphasizes upgrading strategies for development, yet recent studies such as Bernhold (2022) highlight that these strategies often prioritize business interests over sustainable development goals. This gap is critical to understanding how agribusiness can align with both global market demands and sustainability objectives. This study fills this gap by examining the tension between corporate profit maximization and the pursuit of broader development goals.

This literature review establishes a solid theoretical foundation for understanding the role of agribusiness in promoting a green economy. By integrating sustainable development, green economy, and CSR theories, the review demonstrates the critical contributions agribusiness can make to environmental sustainability. However, several gaps remain in understanding the specific policies and innovations needed to drive the transition to a green economy within agribusiness. This study aims to address these gaps, offering insights into how

agribusiness can support the green economy through policy innovation, technological adoption, and sustainable practices.

RESEARCH METHOD

This study employs a qualitative research design, with a focus on analyzing data through **NVivo 14** software. The process was carried out in several structured stages to ensure clarity, transparency, and replicability of the analysis. The following steps outline the detailed methodology adopted in this study:

1. Survey Sample and Demographics

The study involved a total of 116 respondents who were selected based on specific inclusion criteria. The sample consisted of 47.4% male and 52.6% female, ensuring gender balance in the representation. Respondents were required to meet the following criteria:

- Be actively involved in the agribusiness sector.
- Possess experience in agribusiness policies, market dynamics, or sustainability practices.

This demographic composition ensures that the sample is diverse and provides comprehensive insights into agribusiness practices, specifically their relationship with the green economy. The respondents' experiences are crucial to understanding the policies, innovations, and challenges faced in the sector.

2. Data Collection and Coding Process

Data collection involved surveys that assessed policy implementation, innovation practices, and their perceived impact on sustainability in agribusiness. The collected data were stored and organized in NVivo 14 for analysis. The steps followed were:

- **Data Preparation and Organization:** This stage involved importing various types of data, including text, audio, and video, and classifying them into nodes based on the research objectives. Each node was associated with a particular theme, such as green economy policies, adoption of sustainable technologies, and resource efficiency.
- **Data Coding:** The NVivo software was used to code the data by linking survey responses and other collected materials to relevant nodes. The software's word search, relationship analysis, and thematic mapping features were employed to identify patterns and connections within the data.
- **Data Analysis:** The coded data were analyzed to identify key themes, such as the influence of agribusiness policies on sustainability, technological innovations, and the role of cross-sector collaboration in driving the green economy.

3. Triangulation Techniques

To enhance the robustness and credibility of the findings, triangulation techniques were applied:

- **Data Triangulation:** Multiple data sources were utilized, including survey responses, policy documents, and industry reports. By comparing findings across these different sources, the study ensured a comprehensive understanding of the issues at hand and minimized bias in interpreting the data.
- **Methodological Triangulation:** This study used both qualitative coding and word cloud analysis to cross-validate results and enhance the richness of the findings. The triangulation process ensured that the themes identified were not based on a single data type or method, but were confirmed across multiple approaches.

4. Interpretation and Reporting

Once the analysis was complete, the results were compiled into detailed reports. The findings were supplemented with visualizations, such as charts and diagrams, to aid in the interpretation and to make the results clearer. Specifically:

- **Word Cloud Analysis:** A word cloud was generated to visualize the most prominent themes within the data, which highlighted the key focus areas such as policy and sustainability.

- **Thematic Distribution:** Diagrams and charts illustrated the frequency and distribution of key themes, providing an overview of the most prevalent concepts discussed by respondents.

During the interpretation stage, the research team revisited previous stages of analysis to refine the results and ensure that the conclusions were fully supported by the data.

5. Use of NVivo and Additional Resources

The study utilized NVivo 14 for data analysis, ensuring optimal software usage throughout the research process. The following steps were undertaken to maintain the quality and rigor of the analysis:

- **Software Updates:** The latest versions of NVivo 14 were regularly used to ensure compatibility with the analysis and to benefit from the software's advanced features.
- **Additional Resources:** The research team consulted additional resources, such as guides and best practices for qualitative analysis, to enhance the accuracy of the results and ensure that the methodology was up to date with current standards in qualitative research.

6. Analytical Strategy

As highlighted by Woolf & Silver (2018), qualitative analysis remains dynamic and

unpredictable, even when conducted through structured software. Therefore, it was crucial to separate analytical strategies from the software usage tactics. In this study, the Five-Level QDA® method (Woolf & Silver, 2018) was applied to break down the analysis process and ensure a more comprehensive understanding of the data. This approach helped enhance the effectiveness of the analysis by focusing on different levels of data interpretation.

The methodology presented above outlines a transparent, replicable approach to conducting qualitative

analysis in agribusiness research. By using NVivo 14, triangulation techniques, and robust data coding and reporting strategies, this study ensures that its findings are grounded in solid research practices. These methodological choices enhance the credibility of the study and contribute to the ongoing dialogue about the role of agribusiness in the transition to a green economy.

RESULT ANALYSIS

Diagram 1: Connections Between Agribusiness and Various Factors Affecting the Green Economy

interconnected with policy, market dynamics, technological innovation, and environmental sustainability. The clearer depiction of these relationships is vital for understanding the complex interactions that drive the green economy.

Key Findings

1. NVivo Coding Analysis

The coding analysis in NVivo 14 indicates that the main categories in this study - Agribusiness, Green Economy, and Employees - cover nearly 100% of the analyzed data. This confirms that the entire study revolves around these core themes. The categories identified provide a clear framework for understanding how agribusiness influences the green economy and the role of labor within it.

2. Key Terms and Their Coverage

Key terms with significant coverage in the data analysis include:

1. Policy (~20%)
2. Agribusiness (~18%)
3. Economy (~14%)
4. Sustainability (~12%)

These key terms highlight the central role of policy in driving agribusiness transformations toward a green economy. The prominence of terms like "agribusiness" and "sustainability" further underscores the study's focus on making agricultural practices more environmentally and socially responsible.

Further insights from the study can be observed in Table 1, which presents an overview of Agribusiness, Green Economy, and Employees.

Table 1
Agribusiness, Green Economy, and Employees

| Coding | Percentage coverage |
|--|---------------------|
| Agribusiness, Green Economy and Employee\\Agribusines, Green Economy and Employee relationship | 100.00% |
| agribisnis | 15.87% |
| kebijakan | 10.84% |
| daya saing | 9.09% |
| diperlukan | 10.54% |
| ekonomi | 14.13% |

| | |
|---------------------|--------|
| hijau | 8.79% |
| keberlanjutan | 7.41% |
| kebijakan | 18.37% |
| kerja | 11.37% |
| ketergantungan pada | 8.17% |
| kolaborasi | 7.74% |
| Mendukung | 13.41% |
| Mengurangi | 13.23% |
| meningkatkan | 11.75% |
| penting untuk | 12.51% |
| Petani | 7.60% |
| Serta | 7.97% |
| Untuk | 24.02% |
| Yang | 14.84% |

Percentage Coding of Agribusiness, Green Economy, and Employees

3. Word Cloud Analysis

The Word Cloud analysis further highlights a strong focus on sustainable economic policies, with attention given to agribusiness, energy, and climate change. The prominent words in the word cloud, such as "policy", "economy", "sustainability", and "green", suggest that the study heavily emphasizes the role of government regulation and environmental practices in shaping the green economy.

The Word Cloud analysis further highlights a strong focus on sustainable

economic policies, with attention to agribusiness, energy, and climate change. Collaboration between the public and private sectors, as well as human resource capacity-building through training and education, are essential aspects discussed. This reflects a holistic approach to economic development that not only focuses on economic growth but also sustainability and social welfare. The Word Cloud Analysis can be seen in Figure 2, which illustrates Agribusiness and the Factors Influencing the Green Economy.

The relationships between these categories, shown through the connections in the diagram, indicate how factors like policy, market dynamics, and technological innovation influence one another within the agribusiness ecosystem.

4. Dominant Keywords and Themes

Key findings from the word cloud analysis include:

1. Dominant Keywords: Words such as "policy", "and", "for", and "economy" appeared prominently, indicating that the discussion primarily revolves around economic strategies and policies aimed at achieving a more sustainable agribusiness system.
 2. Focused Sectors: Key terms like "agribusiness", "energy", "farmers", and "biomass" suggest that the core focus of discussions is on agribusiness practices and their role in energy production and sustainability.
 3. Environmental Concerns: Terms like "environment", "climate change", and "sustainability" point to the growing concern for environmental conservation and sustainable practices within agribusiness.
- From the results, several significant factors influencing the green economy through agribusiness have been identified:
1. Agribusiness Policies: Policies play a central role in shaping the green economy, particularly in terms of promoting sustainable practices and green technology adoption. The coding and word cloud analysis consistently highlight the importance of policy in facilitating the transition toward a green economy.
 2. Technological Innovation: Innovations in agricultural technology, including climate-smart agriculture and biomass utilization, are key to improving resource efficiency, reducing emissions, and fostering sustainability in agribusiness.
 3. Environmental Sustainability: There is a clear emphasis on the importance of environmentally friendly practices, such as zero tillage and biomass utilization, which help mitigate the impact of agriculture on the environment and contribute to long-term sustainability.
 4. Market Dynamics and Collaboration: The results emphasize the importance of cross-sector collaboration between government, the private sector, and civil society. This collaboration can facilitate the adoption of sustainable practices and the scaling of green technologies across the agribusiness sector.

5. Labor and Workforce Development: Enhancing workforce skills and promoting employment in sustainable agribusiness practices were also highlighted as crucial for the green economy's growth. Skilled labor is essential for adopting new technologies and implementing environmentally friendly practices in agriculture.

The results analysis clearly illustrates the complex interplay between agribusiness, policy, and sustainability in driving the green economy. The findings emphasize the importance of agribusiness policies, technological innovations, environmental sustainability practices, and cross-sector collaboration. These results lay the foundation for the discussion in the following section, where the implications of these findings will be explored in greater depth.

DISCUSSION

This study aligns with the theoretical frameworks of sustainable development (Brundtland, 1987) and the green economy (Oncel, 2023), both of which stress the need for a balanced approach between economic growth, environmental sustainability, and social equity. The findings validate these theoretical perspectives, highlighting the dynamic nature of the green economy. It is not a linear process, but a multifaceted system in which various factors such as policy, market dynamics, technological innovation, and cross-sector collaboration must be aligned for

sustainable success. The complexity observed in the interconnected relationships among these factors suggests that an integrated approach is essential to transitioning towards a green economy.

Key Findings and Theoretical Alignment

The findings from this study demonstrate that agribusiness policy is central to driving the transition to a green economy. Government regulations such as subsidies, export-import taxes, and investment incentives directly shape the operational landscape of agribusiness. Moreover, market dynamics and technological innovation emerge as pivotal forces in the green economy, where shifts in supply and demand, price fluctuations, and advancements in precision agriculture and biotechnology influence agricultural practices and sustainability outcomes.

Further drawing from the circular economy concept (Geissdoerfer et al., 2017), this study suggests that agribusinesses, through the adoption of biomass utilization and sustainable agriculture technologies, can contribute significantly to resource efficiency, waste reduction, and the reduction of carbon emissions. While these findings align with theoretical concepts, the practical integration of these ideas is constrained by insufficient policy support and a lack of adequate infrastructure in certain regions.

Practical Implications

The findings have several practical implications for policy and practice. From a policy perspective, it is crucial for governments to ensure policy coherence across sectors to prevent unintended disruptions. For instance, changes in agricultural policies should be considered in the broader context of market dynamics and production systems to ensure they do not conflict with other sectors. Policies that prioritize green technology adoption, resource efficiency, and carbon emission reduction will be key to shaping the future of sustainable agribusiness.

Additionally, technological innovation plays a critical role in fostering a green economy. Agribusinesses must embrace cutting-edge solutions like predictive crop yield analysis, big data, and AI to increase efficiency and reduce their environmental footprint. To achieve this, it is imperative for agribusinesses to invest in research and development (R&D) and establish collaborations with technology providers.

Another practical implication involves the capacity-building of the workforce. The agribusiness sector requires a skilled labor force that can adapt to new sustainable practices and technologies. This calls for robust training programs and educational initiatives that focus on developing skills in eco-efficient agriculture. Moreover, businesses should implement social responsibility programs that prioritize labor welfare, ensuring that workers benefit from sustainable

practices while contributing to the green economy.

Strategic Implications for Agribusinesses

The strategic implications of this study suggest that agribusinesses should incorporate sustainability as a core component of their business strategies. This involves prioritizing the adoption of green technologies and environmentally friendly practices across operations. Collaboration with governments, technology providers, and other stakeholders is essential to ensure that policies align with market needs and technological advancements. Data-driven decision-making will help agribusinesses better manage risks, seize opportunities, and address sustainability challenges effectively.

Research Gaps and Future Directions

While this study contributes valuable insights, several research gaps remain. Empirical validation of the findings is needed to confirm the impact of specific green policies on agribusiness performance. Comparative studies across different regions or countries could provide more detailed insights into how regional variations affect the adoption of sustainable practices and the transition to a green economy. Furthermore, future research could explore the long-term effects of green policies on the sustainability and competitiveness of agribusiness, especially in the context of global economic challenges.

The complexity of the relationships in agribusiness, as illustrated in the study, suggests the need for a multidimensional approach to policy formulation. The interconnectedness of policy, market dynamics, technological innovation, and sustainability practices requires that policies are not only responsive but also holistic. Policies should aim to integrate these factors in a way that supports long-term sustainability and resilience in the agribusiness sector.

The findings from this study underscore the crucial role of agribusiness policies, technological innovations, and cross-sector collaboration in driving the transition to a green economy. The study highlights that green policies, technological adoption, and workforce capacity-building are key to achieving sustainability and improving the competitiveness of agribusinesses. The findings provide actionable insights for policymakers to design coherent policies that promote environmental sustainability, support the adoption of green technologies, and improve labor welfare in the agribusiness sector. By focusing on these factors, governments and businesses can work together to foster a green economy that balances economic growth, environmental sustainability, and social equity.

Future research should focus on empirical validation of green policies' impact on agribusiness, explore regional variations in sustainable practices, and investigate the long-term effects of these policies on agribusiness sustainability. This will help develop more

comprehensive and inclusive strategies for agribusinesses transitioning to a green economy, ensuring they can adapt to future challenges while maintaining their role in food security and environmental conservation.

CONCLUSION

This study addresses the critical role of agribusiness in transitioning toward a green economy, focusing on the integration of various sectors, including agriculture, fisheries, livestock, forestry, agricultural processing industries, and renewable energy. The central research question explored how policies and innovations in agribusiness support the green economy. Through data collected from surveys assessing policy implementation and the adoption of sustainable technologies, the study aimed to evaluate their perceived impact on sustainability and resource efficiency.

The results highlight that agribusiness is significantly influenced by policies promoting green technologies, resource efficiency, and carbon emission reduction. Additionally, the findings emphasize the importance of cross-sector collaboration in accelerating the adoption of environmentally friendly practices while enhancing efficiency and productivity. The study confirms that integrating these sectors in a synergistic manner is vital to fostering sustainable and environmentally conscious economic growth. Key themes identified from the data, such as the prominence of policies supporting sustainability and technological innovations, underscore

the necessity for coordinated efforts across sectors to achieve a green economy.

The practical implications of this study are significant for policymakers and agribusiness leaders alike. The findings suggest that agribusiness policies should prioritize green technology adoption, resource efficiency, and carbon reduction strategies. Policymakers are encouraged to create regulations that incentivize sustainable agricultural practices and foster collaboration between the private and public sectors. Furthermore, the study advocates for capacity-building programs to enhance the workforce's ability to adopt new technologies and implement eco-friendly practices. The results provide valuable insights for

businesses looking to align their strategies with sustainable development goals and for governments seeking to promote green economic practices that also support social and environmental welfare.

Limitations

This study exclusively relied on qualitative data, based on participants' perceptions rather than empirically tested policy impacts. The findings reflect subjective opinions and should be viewed as qualitative insights rather than definitive causal relationships. Future research could incorporate empirical data and expand the analysis to different regions or sectors to validate and generalize the results further.

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