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# SOCIAL MEDIA MANAGEMENT IN THE EDUCATION OF RENEWABLE ENERGY GENERATING COMPANIES WITH COCOA WASTE AND ITS CONTRIBUTION TO SUSTAINABLE BUSINESS GROWTH IN ECUADOR

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## ABSTRACT

*Digitalization and the transition to sustainable energy are two fundamental processes changing how companies are managed in developing countries. Within this framework, the research examined the connection between the strategic management of social networks, business education focused on sustainability, and the energy use of cocoa waste. The goal was to suggest a conceptual model that explains how these factors promote the sustainable growth of companies in Ecuador. Methodologically, the study employed a qualitative, non-experimental, and documentary approach, involving a review and critical analysis of scientific literature published in recognized academic databases between 2010 and 2024. The findings were organized into four analytical areas: (1) Strategic social media management and business performance, (2) Business education and sustainable digitalization, (3) Cocoa biomass and the circular economy, and (4) Sustainable business growth in developing economies. The analysis revealed that digital management enhances the visibility, legitimacy, and competitiveness of companies operating in the bioenergy sector, while business education facilitates the adoption of sustainable production models. Similarly, using cocoa waste as an energy source was presented as a strategic opportunity based on circular economy principles. The study's theoretical contribution is an integrative conceptual model relating these areas, providing a basis for future empirical studies and business strategy development focused on the sustainable growth of Ecuador's bioenergy sector.*

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**KEYWORDS:** Social Media Management; Business Education; Cocoa Biomass; Circular Economy; Sustainable Business Growth.

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## 1. INTRODUCTION

In the twenty-first century, digitalization has profoundly transformed organizational management models, altering the way companies relate to their stakeholders, organize communication processes, and develop lasting competitive advantages. In this context, social networks have emerged as essential tools in the digital landscape, extending their function beyond promotion to become integral to business management. According to Kaplan and Haenlein (2010), social networks are online platforms that allow users to create and share content. These platforms generate spaces for interaction that directly affect an organization's reputation and how the market perceives its value. This phenomenon opens up new possibilities for companies that want to improve their position and performance through comprehensive digital strategies.

Multiple studies have shown that strategic social media management positively affects business efficiency. Tajvidi and Karami (2017) state that organized use of digital platforms fosters market orientation, improves customer relationships, and reinforces innovation, thereby impacting organizational performance. Similarly, Trainor *et al.* (2014) argue that social media management capabilities enable companies to gather valuable information, improve decision-making, and increase competitiveness. These findings suggest that social media management is an interconnected practice that contributes to real business results.

In the context of business sustainability, digitalization plays a pivotal role in communicating responsible practices. Porter and Kramer (2011) argue that creating shared value necessitates aligning economic goals with social and environmental impact, requiring effective communication and transparency mechanisms. Social networks facilitate direct interaction with interested groups, thereby strengthening the organization's legitimacy and trust in its institutions. Recent research shows that strategic digital communication affects the perception of corporate social responsibility, influencing the company's reputation and sustainable growth (Du, Bhattacharya, & Sen, 2010).

Meanwhile, the concept of sustainable growth has evolved to encompass financial performance, environmental impact, and social responsibility. The triple bottom line approach, proposed by Elkington (1997), suggests that organizations must balance economic, social, and environmental aspects to ensure their long-term viability. From this perspective, a company's growth should focus not only on economic indicators but also on energy

efficiency, emission reductions, and community development contributions.

In the energy sector, shifting to renewable sources is one of today's main global challenges. The International Energy Agency has emphasized the importance of diversifying the energy matrix to reduce dependence on fossil fuels and address climate change. In this context, biomass emerges as a significant option because it enables the transformation of agricultural waste into useful energy. According to Demirbas (2009), biomass is a renewable energy source with great sustainability potential, particularly in countries with robust agro-industrial production.

Among biomass sources, cocoa residues have properties that make them viable inputs for bioenergy production. Cocoa is one of the most important crops in tropical countries, and processing it generates secondary products, such as husks and organic waste, that can be used to generate energy. Recent research has revealed that these wastes have physicochemical characteristics suitable for various energy conversion techniques, such as combustion, gasification, and biogas production (Boateng *et al.*, 2019). Using these residues not only supports the production of clean energy but also helps reduce waste and establish circular economy models.

A circular economy is a production model focused on reusing resources and reducing waste. It contrasts with the classic linear model of producing, using, and disposing of goods. Kirchherr, Reike, and Hekkert (2017) explain that the circular economy aims to keep materials in the production process for as long as possible to promote efficiency and sustainability. In the cocoa industry, recovering energy from waste can strengthen sustainable production chains and create new business opportunities related to bioenergy.

In Ecuador, for example, cocoa is an emblematic product due to its economic importance and international prestige. However, cocoa production generates large amounts of waste that can have detrimental environmental effects if not managed properly. However, this waste also presents a strategic opportunity to develop renewable energy projects that promote sustainable territorial development. In this context, the connection between energy innovation and business management is especially relevant.

Business education is crucial in this process of change. According to Neck and Greene (2011), entrepreneurship and sustainable management training improves entrepreneurs' strategic capabilities, facilitating the adoption of innovative and responsible models. Combining knowledge of

sustainability, digital marketing, and energy management can make start-ups more competitive in the bioenergy sector. Additionally, knowledge transfer and continuous training are essential for establishing sustainable business models (Fayolle & Gailly, 2015).

Despite well-established literature on topics such as social media management, sustainability in business, and bioenergy, as well as business education, significant theoretical fragmentation remains, preventing a full understanding of the possible strategic connections between these areas. Most research assesses the impact of social media on financial performance (Tajvidi & Karami, 2017) or analyzes corporate sustainability from environmental and governance perspectives (Elkington, 1997; Porter & Kramer, 2011). Meanwhile, bioenergy studies tend to focus on the technical aspects of energy conversion and efficiency (Demirbas, 2009). However, little research has investigated how digital management could link energy innovation, entrepreneurship education, and sustainable growth. This lack of conceptual connection indicates the need for a more comprehensive approach that goes beyond sectoral visions and helps develop analytical frameworks that address multiple dimensions.

In the context of Latin America, particularly Ecuador, this discrepancy is more noticeable due to the characteristics of its economies. Small and medium-sized companies predominate, and they have few resources to invest in technological innovation and advanced digital strategies. According to research on digitalization in emerging economies, strategically adopting digital technologies could be key to standing out in highly competitive markets (Nambisan, 2017). However, a lack of specialized training and models integrating sustainability, digital communication, and renewable energy production restricts growth opportunities in innovative sectors, such as bioenergy from agro-industrial waste. In this area, the link between digital management and sustainability presents a challenge and an opportunity for companies to increase their competitiveness at the local level.

Conversely, Ecuador's cocoa sector is of great economic and cultural importance, having gained international recognition for the quality of its fine aroma cocoa. However, the energy potential of waste generated during production has not yet been fully exploited in a sustainable business model. Literature on the circular economy highlights that valorizing agricultural by-products can create new business models based on innovation and sustainability

(Kirchherr et al., 2017). Companies that produce renewable energy from cocoa biomass require technical skills as well as communication and positioning strategies to highlight their sustainable value proposition to investors, consumers, and local communities. Strategic management of social networks could be key to establishing legitimacy and generating institutional trust in this case.

Business education is also essential to consolidating these processes of change. Training in digital skills, sustainability, and energy management enables entrepreneurs to develop dynamic competencies that help them adapt to changing contexts (Fayolle & Gailly, 2015). Neck and Greene (2011) argue that entrepreneurship education must transform into practical methodologies that incorporate innovation, sustainability, and strategic reasoning. Targeted training in the field of cocoa-related bioenergy companies can improve long-term decision-making skills, support responsible practices, and encourage the use of clean technologies. However, thus far, research has not sufficiently addressed how business education can be connected with digital management strategies to promote sustainable growth in emerging energy sectors.

Therefore, a conceptual approach is necessary to understand the relationships between social media management, business education, bioenergy derived from cocoa waste, and the sustainable growth of companies. This approach is especially relevant in developing economies, where digitalization and the energy transition can be complementary forces for sustainable economic progress. Designing a conceptual model that connects these areas helps fill theoretical gaps found in the literature and provides an analytical basis for developing business strategies and public policies that strengthen the sustainable competitiveness of Ecuador's bioenergy sector. Thus, the current study goes beyond analyzing isolated trends and suggests structured integration to understand how strategic digital management can drive sustainable business growth within the framework of a circular economy applicable to the cocoa sector.

## 2. JUSTIFICATION

The global restructuring of markets, driven by digital advances and the adoption of sustainable production methods, has created a need for multiple perspectives in today's business management. In this context, the relationship between digital strategies, ecological sustainability, and energy innovation is essential for organizational competitiveness, not just

an academic issue. Several researchers have identified that digitalization in business alters not only communication methods but also business models and value creation processes (Nambisan, 2017). However, there is still a lack of understanding of how to strategically integrate these transformations into emerging energy sectors based on the circular economy.

From an economic standpoint, sustainability has emerged as a key element for ensuring the continuity of organizations in highly competitive environments. The triple bottom line approach, proposed by Elkington (1997), suggests that companies must balance financial performance, social impact, and environmental responsibility to ensure long-term sustainability. Thus, a company's sustainable growth not only translates into increased revenue but also into the efficient use of resources and the creation of social value. This study examines how modern tools, such as strategic social media management, can promote this type of growth in innovative energy sectors.

Studies on social media management have demonstrated its impact on company performance, particularly in building reputation, fostering customer loyalty, and establishing a competitive advantage (Trainor *et al.*, 2014; Tajvidi & Karami, 2017). However, most research has focused on traditional business sectors or large companies, leaving the strategic application of social media management in agro-industrial, biomass-based, renewable energy companies relatively unexplored. The absence of comprehensive studies hinders the development of concepts that explain how digital communication strengthens sustainable business models.

In the energy sector, transitioning to renewable sources is a global priority in the face of climate change and growing energy demand. Biomass, particularly agricultural waste, is recognized as a viable option for diversifying the energy matrix and reducing carbon emissions (Demirbas, 2009). In cocoa-producing countries like Ecuador, grain processing waste constitutes a potential resource for bioenergy production under the principles of the circular economy. The success of these production models depends on technical feasibility and the ability to integrate into competitive markets and communicate sustainable value propositions effectively.

The circular economy, which is a system that focuses on the efficient use of resources and minimizing waste, provides a relevant conceptual framework for examining how cocoa energy can be

harnessed (Kirchherr *et al.*, 2017). Implementing these models requires advanced business skills, specialized education, and digital positioning plans to attract investments and generate trust among stakeholders. This research is significant because it explores the connection between energy innovation, business training, and digital management— aspects that are usually analyzed separately.

From an academic perspective, this study helps fill an important theoretical gap. While there is substantial research on corporate sustainability (Porter & Kramer, 2011), innovation-focused business education (Neck & Greene, 2011), and bioenergy from agricultural residues (Boateng *et al.*, 2019), the existing literature lacks a model integrating these variables' interactions in emerging economies. This fragmentation hinders the creation of applicable knowledge to guide strategic decisions in specific productive sectors.

From a social perspective, the study is significant due to the potential positive impact of growing bioenergy companies on rural cocoa-producing communities. Recovering energy waste could promote employment, diversify income sources, and strengthen sustainable production chains. However, these benefits will only materialize if companies implement communication and education strategies that promote responsible practices and establish trusting relationships with local communities. Strategic management of social networks is key to territorial integration.

Additionally, business education is essential to ensuring the sustainability of these production models. According to Fayolle and Gailly (2015), entrepreneurship training enhances strategic capabilities and facilitates the adoption of new technologies. In Ecuador, where small and medium-sized businesses with limited resources predominate, training in sustainability and digital management could be crucial for advancing bioenergy initiatives from cocoa. Therefore, including business education in the analysis helps us understand sustainable growth beyond purely economic aspects.

From a methodological standpoint, conducting a thorough literature review is valuable for organizing dispersed knowledge and creating a cohesive conceptual framework. This approach allows us to identify common ground, compare perspectives, and suggest causal relationships to guide future empirical studies. It also establishes a solid foundation for developing public policies that promote the energy transition and digitalization of companies in key agroindustrial sectors.

On a practical level, this research has direct

implications for entrepreneurs, public administrators, and policymakers. Understanding how social media management can enhance business education and promote sustainable growth in renewable energy companies provides the bioenergy sector in Ecuador with strategic tools to improve its competitiveness. This integration could facilitate attracting green investments, stimulate strategic collaborations, and strengthen sustainable markets.

The importance of this study lies in its contribution to the connection between digitalization and renewable energy – two fundamental processes that will shape economic progress in the coming decades. By presenting a conceptual model that unites digital management, business training, bioenergy, and sustainable development, the research enriches academic discussions and provides a strategic vision applicable to Ecuadorian environments. Thus, the necessity of addressing this issue from a multidisciplinary perspective to understand the complex dynamics of sustainable development in growing economies is well-argued.

### 3. GENERAL OBJECTIVE:

The general objective of the study is, through a structured documentary review, analyze the relationship between strategic management of social networks, business education, and the use of cocoa waste to generate renewable energy. Then, propose a conceptual model that explains how these factors contribute to sustainable business growth in Ecuador.

## 4. METHODOLOGICAL FRAMEWORK

### 4.1 Approach and type of research

This analysis uses a qualitative approach to understand, interpret, and construct the conceptual connection between social media management, business education, bioenergy from cocoa waste, and the sustainable growth of companies. According to Creswell (2014), qualitative research involves investigating complex phenomena through interpretive examination of documentary sources to facilitate creation of conceptual frameworks integrating different elements.

This research is documentary and not experimental since no variables are altered or primary data obtained; rather, analyses and systematizations of theoretical and empirical contributions already published are carried out. Hernández-Sampieri and Mendoza (2018) state that document-based studies review secondary information to identify patterns, conceptual coincidences, and areas in need of further investigation.

Additionally, the project employs an integrative documentary review methodology, understood as a systematic process of collecting, critiquing, and synthesizing literature from various disciplines to develop new theoretical perspectives (Torraco, 2005). This approach is useful for combining areas of knowledge that are often separate, such as digitalization, energy sustainability, and business education.

### 4.2 Search strategy and selection of sources

To ensure the incorporation of scientific literature that is duly indexed and updated, the information was collected through consultation of highly relevant academic databases, mainly Scopus, Web of Science, and Google Scholar. These databases were chosen for their international recognition and wide coverage of disciplines such as administration, sustainability, renewable energies, and digital communication.

The time frame established covers from 2010 to 2024 to include recent studies relating to digital transformation and the energy transition without neglecting seminal works important to supporting the theory. Regarding language, priority was given to publications in English and Spanish since most scientific production in the areas of interest is in these languages.

Keywords included combinations such as social media management, business sustainability, renewable energy, biomass, cocoa waste, entrepreneurial education, the circular economy, and sustainable business growth. These terms were combined using Boolean operators to expand thematic coverage without overly limiting the results.

#### Inclusion criteria:

- Scientific articles and theoretical reviews published in indexed journals.
- Studies related to at least one of the four defined thematic axes.
- Research with a solid empirical or conceptual foundation.
- Publications within the established time range.

#### Exclusion criteria:

- Documents without academic support (blogs, journalistic articles).
- Duplicate posts.
- Studies with a strictly technical approach without links to management or business sustainability.
- Non-peer-reviewed literature.

The application of these criteria made it possible to form a pertinent and coherent documentary corpus with the objective of the study.

### 4.3 Document analysis technique

The analysis of the information was carried out through thematic content analysis, a technique that allows the identification of recurring categories, conceptual patterns, and relationships between variables within a set of documents (Krippendorff, 2018). This procedure involved an exhaustive and critical reading of the selected sources, followed by a process of coding and categorization according to the defined analytical axes.

Following the methodological proposal of Braun and Clarke (2006), the analysis was developed in the following phases:

1. Familiarization with the selected documents.
2. Identification of key concepts and emerging categories.
3. Grouping of findings into thematic axes.
4. Interpretative integration of results.
5. Conceptual synthesis oriented to the construction of the model.

This procedure allowed the review to be structured in four fundamental axes:

1. Social media management and business performance.
2. Business education aimed at sustainability.
3. Cocoa biomass and circular economy.
4. Sustainable business growth in emerging economies.

The thematic categorization facilitated the identification of theoretical convergences and the construction of an integrative narrative that articulates digitalization, energy innovation and sustainability.

### 4.4 Process for the creation of the conceptual model

The creation of the conceptual model is based on the theoretical integration approach suggested by Jabareen in 2009, who argues that these models arise from the identification and connection of key concepts obtained from document analysis. In this context, the following primary variables were recognized:

- Strategic social media management.
- Business education focused on sustainability.
- Energy use of cocoa waste.
- Sustainable business development.

A literature review was conducted to define the theoretical links between these concepts, taking into account the contributions of dynamic capabilities theory (Teece, 2007), the shared value generation approach (Porter & Kramer, 2011), and the circular economy vision (Kirchherr *et al.*, 2017).

In this phase, the suggested conceptual model does not seek to empirically validate the causal relationships, but rather to provide an explanatory structure that will serve as a basis for future quantitative or mixed-methods research. According to Whetten (1989), creating conceptual models is a key step in developing theories because it helps organize variables and establish connections that will guide subsequent research.

### 4.5 Methodological rigor

To ensure the quality of the study, specific criteria of the qualitative documentary research were implemented, such as:

- Credibility, through the choice of sources that are indexed and peer-reviewed.
- Transferability, by situating discoveries within the context of Ecuador.
- Theoretical consistency, ensuring that there is coherence between the topics analyzed.
- Methodological transparency, by meticulously detailing the search and analysis process.

These criteria help to reinforce the internal validity of the research and to ensure that the conclusions obtained from the documentary analysis are based on reliable scientific literature.

## 5. RESULTS

### 5.1 Strategic Social Media Management and Sustainable Business Performance

A study of documents shows that the management of social media has evolved from a mere communication tool into an essential element of organizational competitiveness. According to Kaplan and Haenlein (2010), social networks are digital spaces that facilitate the creation of collaborative content and establish interaction dynamics that directly impact the perception of value and companies' reputations. This interactive facet transforms the traditional company-customer relationship into an ecosystem where trust, transparency, and participation are paramount.

Several empirical studies demonstrate that strategically using social networks positively affects company performance. For example, Trainor *et al.* (2014) demonstrated that organizational capabilities in social media management reinforce customer orientation and optimize strategic decision-making. Tajvidi and Karami (2017) argue that integrating social media into corporate strategy promotes open innovation and improves financial performance by creating market intelligence. These findings suggest that digital management is a fundamental skill

affecting long-term competitive advantage, not a secondary resource.

From a sustainability perspective, social media also plays an important role in communicating responsible practices. Du, Bhattacharya, and Sen (2010) found that effectively communicating social responsibility initiatives impacts business reputation and stakeholder loyalty. Therefore, companies working with renewable energy models can use digital platforms to highlight their positive environmental impact, thereby strengthening their institutional legitimacy.

In renewable energy-related industries, digital outreach is critical because it educates the market on new technological offerings. The literature suggests that digital communication strategies prioritizing transparency and scientific dissemination may influence the public's perceptions of alternative energies (Porter & Kramer, 2011). Thus, strategic social media management is presented as a driver of sustainable business growth by facilitating the connection between economic performance and environmental responsibility.

### ***5.2 Business training focused on sustainability and digital transformation***

The second aspect examined reveals that business training is key to adopting sustainable and digital models. Neck and Greene (2011) argue that entrepreneurial education should adopt methodologies integrating strategic thinking, innovation, and sustainability. Recent studies emphasize that digital skills are crucial for organizational competitiveness, particularly in environments characterized by technological disruption (Nambisan, 2017).

Fayolle and Gailly (2015) assert that business training reinforces the dynamic skills necessary for entrepreneurs to adapt to environmental changes. These skills include technology absorption, innovation management, and understanding sustainable markets. In the bioenergy sector, specialized education promotes the adoption of clean technologies and the implementation of digital strategies that align with sustainability objectives.

Similarly, Lozano et al. (2017) emphasize that education focused on sustainable development creates business leaders capable of incorporating environmental considerations into their decisions. This approach is particularly important in developing countries, where the clean energy transition requires technological infrastructure and skilled individuals capable of managing complex processes.

The study's findings suggest that business education and digital management should be

approached interdependently. The literature indicates that combining digital skills with environmental awareness enhances organizational performance in green sectors. Therefore, business education is positioned as a mediating element between the strategic management of social networks and sustainable growth by promoting the correct use of digital tools in a responsible way.

### ***5.3 Cocoa biomass, circular economy and renewable energy generation***

The third pillar shows that using biomass from agricultural waste for energy transformation is a key option. According to Demirbas (2009), biomass is a renewable resource that can reduce carbon emissions and diversify the energy matrix. In the cocoa industry, recent studies indicate that organic husks and waste are suitable for combustion, gasification, and biogas production (Boateng et al., 2019).

Kirchherr, Reike, and Hekkert (2017) explain that the circular economy promotes recovering waste as raw materials, thereby favoring system efficiency. Implementing this strategy in the cocoa sector enables the conversion of waste into energy resources, thereby reducing environmental impact and creating innovative business opportunities.

In Ecuador, cocoa is a key product due to its economic importance and international recognition. However, the use of its waste for energy is still incipient within the business framework. According to the literature, technical feasibility must be accompanied by market and communication strategies that establish bioenergy as a competitive alternative to traditional sources.

Analysis of the literature shows that the combination of energy innovation and sustainable business strategies is limited in Latin American contexts. This underscores the urgent need to integrate digital skills, business education, and circular economy models to bolster bioenergy initiatives in the cocoa sector.

### ***5.4 Sustainable business growth in emerging economies***

The fourth pillar emphasizes that sustainable business growth requires balancing financial performance with environmental and social impact. Elkington (1997) notes that to ensure long-term viability, business sustainability must balance these three aspects. Porter and Kramer (2011) build on this concept with shared value, in which companies generate economic benefits by addressing social issues.

In emerging economies, sustainable growth faces structural challenges related to access to financing,

technological gaps, and institutional limitations. However, digitalization provides opportunities to overcome some of these difficulties by reducing communication costs and expanding market access (Nambisan, 2017).

The analysis shows that renewable energy companies can boost sustainable growth by incorporating digital strategies, business training, and circular economy models. Using social media increases business visibility, attracts green investments, and strengthens ties with sustainability-committed stakeholders.

### 5.5 Integrative synthesis and foundation of the conceptual model

Combining the four axes establishes a consistent relational structure. Strategic social media management is presented as a dynamic capability that enhances the visibility and reputation of bioenergy companies. Business education facilitates the development of digital and sustainable skills. The productive heart of the circular economy is represented by the energy use of cocoa waste. Finally, sustainable business growth is configured as the systemic result of the interaction between these variables.

The study indicates that the connection between digital government and sustainable development is indirect and influenced by business empowerment and the ability to implement effective renewable energy models. This supports the theoretical model's suggestion to combine digitalization, training, and bioenergy in a business sustainability scheme specific to the Ecuadorian environment.

Following the documentary analysis of the four thematic axes, Table 1 summarizes the most relevant conceptual findings from the analyzed literature in an orderly manner. The table presents the fundamental theoretical principles of each axis, highlighting their conceptual approach and role in the sustainable development of companies that generate renewable energy from cocoa waste. This organization reveals how strategic management of social networks, business education focused on sustainability, use of biomass according to circular economy principles, and sustainable business growth are linked as complementary dimensions within the proposed conceptual model. Thus, the table organizes the results of the documentary review and helps us understand the theoretical interrelations that support the study's integrative proposal.

*Table 1: Summary of the analytical axes.*

| Analytical Axis                                   | Content Synthesis   |
|---|---|
| <b>Strategic social media management</b>          | Organizational capacity oriented to the planned use of digital platforms to strengthen reputation, interaction with stakeholders, sustainable positioning and business performance. |
| <b>Sustainability-oriented business education</b> | Training in digital skills, innovation and environmental management that facilitates the adoption of sustainable business models and improves strategic decision-making.            |
| <b>Cocoa biomass and circular economy</b>         | Energy use of agro-industrial waste under principles of environmental recovery and efficiency, promoting productive innovation and energy transition.                               |
| <b>Sustainable business growth</b>                | Organizational expansion based on the balance between economic performance, social impact and environmental responsibility, especially in emerging economies.                       |

**Source:** Authors' elaboration based on the documentary review

## 6. CONCLUSIONS

Through a complete documentary review, the present analysis studied the connection between strategic management of social networks, business training, energy use of cocoa waste, and sustainable growth of companies in the Ecuadorian context. The findings demonstrate that, although these areas have been examined separately in the scientific literature, they can be interrelated within a solid conceptual framework that enhances the sustainable competitiveness of emerging bioenergy companies.

First, strategic social media management is established as a key organizational competency that drives sustainable business performance. In addition to serving as communication channels, digital platforms generate market intelligence, build

company reputations, and establish legitimacy. For renewable energy producers, a strong digital presence helps disseminate responsible environmental practices, attract investors interested in sustainability, and establish markets committed to this issue.

Second, business education focused on sustainability is presented as fundamental to effectively implementing digital strategies and innovative energy models. A review of the literature suggests that training in digital skills, strategic thinking, and environmental management reinforces organizations' dynamic capacities, facilitating better adaptation to disruptive technologies and the growing demand for sustainability. In this context, business education acts as a mediator between digitalization and sustainable growth.

Third, analyses related to cocoa biomass and the

circular economy demonstrate the strategic potential of using agricultural waste for energy in countries such as Ecuador. Valorizing cocoa byproducts supports the energy transition, mitigates environmental impacts, and creates opportunities to develop new business models based on innovation and sustainability. However, the success of these strategies requires alignment with sound business plans and efficient digital positioning methods.

The study reveals that achieving sustainable business growth in emerging economies requires a holistic approach combining financial performance, environmental impact, and social responsibility. Digitalization and the energy transition must be understood as complementary processes that can mutually benefit each other when integrated into coherent organizational strategies.

The analysis's main theoretical contribution lies in formulating a conceptual model that connects social network management, business training, and the use of cocoa biomass as interrelated factors influencing sustainable business growth. This connection resolves the fragmentation observed in the literature and provides an analytical basis for future empirical research seeking to validate the proposed relationships.

From a practical standpoint, the results suggest that renewable energy companies in Ecuador should implement a strategy combining technological innovation, business training, and digital communication. Implementing organized social media management plans and training programs in sustainability and digitalization can strengthen the competitiveness of the bioenergy sector and contribute to the territory's sustainable development.

Finally, the analysis's limitations are acknowledged, as it does not include direct empirical validation. Therefore, future research should carry out quantitative or mixed-methods studies to validate the presented conceptual model and evaluate the real impact of digital management and business education on the sustainable performance of bioenergy companies. Extending the analysis to other agro-industrial sectors with energy capacity would also be appropriate to examine the model's applicability in different production contexts.

In summary, the strategic connection between digitalization, business education, and the circular economy applied to the use of cocoa waste is a valuable opportunity to promote sustainable growth for companies in Ecuador. This approach is capable of addressing the current challenges of competitiveness and sustainability.

## 7. RECOMMENDATIONS

Based on the documentary study carried out and the conceptual model presented, the following suggestions are proposed aimed at improving the connection between digital strategic management, business education and the energy use of cocoa waste in the context of Ecuador.

### *7.1 Suggestions for the business sector*

First, companies that produce renewable energy from cocoa waste are advised to establish a formal strategy for social media management, related to their goals of sustainability and business expansion. It's not just about having an online presence, but about developing strategic plans that address audience segmentation, communication about environmental impact, operational transparency, and the creation of educational content about bioenergy. Well-structured digital management can improve corporate image, attract sustainable investment and open new markets.

In addition, it is proposed to integrate digital management into the organization's strategic plan, establishing performance metrics linked to visibility, interaction, positioning of the green brand and perception of sustainability. This will make it easier to assess the true impact of digitalization on business growth.

Secondly, it is recommended that companies in the bioenergy sector apply continuous training programs in digital skills and sustainability, with the aim of strengthening human talent and optimizing strategic decision-making. Training in digital marketing, scientific communication, circular economy and environmental management can contribute to the creation of more resilient and competitive business models.

### *7.2 Suggestions for academic institutions and training centers*

Universities and higher education centers are suggested to include content that integrates digitalization, sustainability, and circular economy in their administration, entrepreneurship, and renewable energy curricula. Training professionals with a multidisciplinary perspective will help boost innovation in key agro-industrial sectors such as cocoa.

Similarly, it is proposed to promote collaboration projects between universities and companies that allow the transfer of technical and digital knowledge to emerging companies in the bioenergy sector. This collaboration can facilitate the adoption of clean technologies and digital strategies with a sustainable approach.

From the field of research, it is advisable to carry

out empirical studies that validate the conceptual model presented in this document, using quantitative or mixed methodologies that can evaluate the relationship between social network management, business education and sustainable growth in companies dedicated to renewable energy.

### 7.3 Suggestions for policymakers

It is recommended that government entities and productive development agencies create incentive policies that integrate digital transformation and energy transition as complementary axes. Green finance programs could include mandatory digital training and strategic communication requirements for beneficiary companies.

In addition, it is relevant to promote regulatory frameworks that encourage the energy use of agro-industrial waste under circular economy principles, facilitating access to financing, technical advice and environmental certifications.

In the specific context of the cocoa sector in Ecuador, it is recommended to promote initiatives that unite producer associations, bioenergy companies and digital platforms, to strengthen

sustainable value chains and generate a positive impact on the territory.

### 7.4 Suggestions for future research

It is advisable to extend the analysis to other agro-industrial areas with energy potential, considering how the conceptual model could be applied in situations other than cocoa. In addition, future research could investigate the impact of additional variables, such as technological innovation, sustainable financing, or responsible organizational culture.

It is also advisable to carry out research over time to assess how digital management influences sustainable performance, especially in developing economies where digitalization and the energy transition are still in progress.

In summary, the effective integration of digital strategies, business training and circular economy models offers a key opportunity to drive sustainable growth in the bioenergy sector in Ecuador. The proposed suggestions seek to convert theoretical discoveries into practical actions that favor the competitiveness and sustainability of the sector.

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