

Research Article

Developing student-led digital entrepreneurship startups in Islamic boarding schools to achieve economic independence aligned with Sustainable Development Goals

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Abstract: *This study aims to examine how digital entrepreneurship among Islamic boarding school students facilitates the development of startup business models oriented towards Sustainable Development Goals (SDGs) to promote economic independence in Islamic boarding schools in Indonesia. Using a multi-case qualitative study approach, data were collected through in-depth interviews, participatory observation, and analysis of institutional documents at two Islamic boarding schools undergoing economic transformation. The findings show that digitalization alone does not automatically result in economic independence; digital tools play a strategic supporting role only if they are integrated into institutionalized entrepreneurial capabilities and value creation mechanisms that are aligned with the SDGs. The study highlights the importance of visionary leadership and the integration of Islamic values (Amanah, Fathonah, Siddiq, Tabligh) in shaping a self-reliant ecosystem. Through the application of a circular economy and the optimization of productive waqf and ZISWAF, Islamic boarding schools can create an integrated business model capable of financing quality education for free and empowering the surrounding community. This research produced the Digital Santripreneur Ecosystem Model, which combines digital infrastructure, micro-fundamental capabilities, and SDG-based business model innovation. This transformation proves that religious-based institutions in developing countries can become competitive sustainable entrepreneurial ecosystems in the digital era.*

Keywords: *Economic Independence, Digitalization, SDGs, Santripreneurship, Start-up Business Model*

1. Introduction

The Sustainable Development Goals (SDGs) have changed the global development discourse by placing business actors as the main drivers of inclusive growth, poverty alleviation, and environmental sustainability (Umoru et al., 2025 ; Setiadi et al., 2025). More organizations are expected to integrate economic performance with social and ecological responsibility (Nygaard et al., 2022). Although corporations and small and medium-sized enterprises (SMEs) dominate existing research, faith-based institutions remain under-explored despite their strong social ties and significant community influence (Zaki et al., 2022). In Indonesia, Islamic boarding schools (pesantren) constitute one of the largest Islamic education networks, combining religious authority, moral education, and grassroots community engagement (Mashuri et al., 2024). Historically, pesantren have not only played a role in religious teaching but also in community empowerment and social transformation (Zaki et al., 2022 ; Mashuri et al., 2024). However, many pesantren still depend financially on school fees, donations, and government assistance. This dependence limits institutional autonomy and hinders long-term strategic development (Zaki et al., 2022).

Digital transformation plays an important role in shaping the entrepreneurial landscape, including in Islamic boarding schools. The spread of digital technologies such as e-commerce, social media

marketing, fintech, and platform-based economies lowers barriers to entry in entrepreneurial activities, enabling more individuals, including Islamic boarding school students, to engage in businesses that can pave the way to economic independence. Digitalization strengthens innovation orientation, encouraging entrepreneurs to create sustainable social and environmental value. Digital capability and digital innovation orientation are key to strengthening sustainable digital entrepreneurship through increased adaptability and targeted innovation (Xu et al.,2022).

However, the adoption of digital technology that is only carried out tactically without a comprehensive strategy can result in entrepreneurial initiatives becoming fragmented and institutionally unsustainable. This also applies to Islamic boarding schools. Successful digital transformation requires a strategic approach, including strong leadership support and a comprehensive understanding of technology integration in entrepreneurial activities. The lack of coordination and leadership to manage this transition can hinder the development of sustainable digital businesses in Islamic boarding schools (Langseth et al., 2022). Furthermore, digitization is not just a tool, but is related to institutional changes that require institutional entrepreneurs who are able to utilize technology to create an integrated business ecosystem. The role of leadership and innovation in Islamic boarding schools is crucial so that digitalization can be translated into sustainable and competitive entrepreneurial transformation in the digital era (Firk et al., 2024).

Digital entrepreneurship among Islamic boarding school students plays an important role in facilitating the development of startup business models oriented towards Sustainable Development Goals (SDGs) and encouraging economic independence in Islamic boarding schools by integrating entrepreneurial values and digitalization into the Islamic boarding school ecosystem. Research examining pesantren entrepreneurship shows that the development of santri entrepreneurship not only focuses on religious learning but also includes entrepreneurial skills that can lead santri to economic independence and prosperity, as demonstrated in the integration of Kasb Asy'ariyah and Locus of Control theories to strengthen the mentality of santri as entrepreneurs (Ma'Arif et al., 2023). In addition, the pesantren community-based business cooperation model is also closely related to the achievement of the SDGs, particularly in the context of poverty eradication (SDG 1), improving the quality of education (SDG 4), and partnerships to achieve goals (SDG 17). This type of cooperation model emphasizes the management of quality human resources and business infrastructure in order to optimize the potential of Islamic boarding schools as sustainable economic communities (Zaki et al., 2022).

The use of digital technology by Islamic boarding school students in entrepreneurship can also bridge the digital divide, which in turn accelerates the holistic achievement of the SDGs. Government investment policies in technology infrastructure, digital skills enhancement programs, and online privacy protection have been shown to have a positive relationship with the progress of the national SDG index, which demonstrates the important role of digital governance in supporting the development of digital entrepreneurship in Islamic boarding schools (Atobishi & Mansur, 2025). SDG-oriented business model innovation is key to the transformation of startups founded by santri, with organizations using a managerial approach to assess contributions to the SDGs and develop business innovation strategies aligned with these goals.

This approach opens up opportunities for pesantren startups to explore and prioritize business models that are not only economically profitable but also sustainable and have a positive social and environmental impact (Rosati et al., 2022). Thus, digital entrepreneurship among Islamic boarding

school students, based on the synergy between religious values, community collaboration, and the use of digital technology, contributes significantly to the development of business models that are not only economically oriented but also promote the strengthening of the economic independence of Islamic boarding schools and the achievement of sustainable development goals.

2. Literature Review And Hypothesis Development

Pesantren as a Basis for Social Economy and Entrepreneurship

Pesantren are Islamic educational institutions that serve multiple functions, not only as centers for the transmission of religious knowledge but also as agents of social and economic development in the community (Suwendi et al.,2024). From the perspective of community-based economic development, pesantren possess strong social capital in the form of trust, the charismatic leadership of kiai, community solidarity, and extensive alumni networks. This social capital is an important foundation for the formation of collective economic activities (Cai, Gu, & Wu, 2021). Most pesantren businesses still face limitations in market access, technology, and managerial capacity, so the business models that have developed tend to be traditional and not yet integrated with the digital economy system. Organizational learning theory explains that business sustainability depends on an organization's ability to learn, adapt, and transform knowledge into innovation (Nam et al.,2023 : Widyastuti, 2019). In the context of pesantren, the learning process occurs through direct practice, habit formation, and social interaction among students (Ma'Arif et al., 2023). When organizational learning is combined with an entrepreneurial orientation that includes innovation, proactivity, and the courage to take risks, small businesses have a greater opportunity to grow and adapt to changes in the business environment (Cai et al., 2021; Nam et al., 2023). Thus, Islamic boarding schools have the potential to become community-based entrepreneurial ecosystems if they are able to transform social capital into structured economic capabilities.

Social Enterprises and Santripreneurship within the SDGs Framework

Social enterprises are hybrid organizational models that combine business practices with social and environmental missions. Unlike traditional non-profit organizations, social enterprises generate income through commercial activities and reinvest profits to create sustainable social impact (Adomako & Nguyen, 2024). This concept is relevant to Islamic boarding schools because their religious values are in line with the goals of community empowerment and economic justice. Santripreneurship has emerged as a unique form of social entrepreneurship based on Islamic education, in which santri (Islamic boarding school students) run business activities with both economic and social missions. This model integrates spiritual values, economic sustainability, and social impact on the community. Within the framework of the Sustainable Development Goals (SDGs), santripreneurs contribute to the creation of decent jobs, poverty reduction, and inclusive economic growth at the local level. Santri businesses also create a multiplier effect through the development of micro-enterprises and the empowerment of communities around Islamic boarding schoolset al., 2024; Tunçalp & Yıldırım, 2022). The growth of santripreneurs is influenced by the existence of a supportive ecosystem such as access to microfinance, social entrepreneurship policies, corporate partnerships, and CSR programs. Entrepreneurship ecosystem theory emphasizes that business success is not only determined by the individual entrepreneur, but by the interaction between educational institutions, government, the private sector, and the community (Audretsch et al., 2023; Williams & Murphy, 2023). Therefore, Islamic boarding schools have the potential to be catalysts for achieving the SDGs if they are able to integrate social values with market mechanisms in a sustainable manner.

Digitalization, Micro-Foundations, and Strategy in the Santripreneurial Ecosystem

Digitalization plays a key role as an enabler in the transformation of sustainable business models (Martínez-Peláez et al., 2024 ; Maulana et al.,2025). Digital technology enables expanded market access, transaction efficiency, operational transparency, and economic network collaboration that was previously difficult for pesantren-based businesses to achieve (Moghrabi et al.,2023). The integration of Industry 4.0 technology and circular economy principles opens opportunities for Islamic boarding schools to develop efficient and environmentally friendly production, particularly in the agribusiness, halal products, and creative economy sectors (Huang & Lau, 2024; Martínez-Peláez et al., 2024). The micro-foundations approach explains that the success of organizational transformation stems from individual capabilities, social interactions, and collective routines (Espina-Romero et al., 2024). In the context of santripreneurship, santri are the main actors who bring basic digital capabilities, entrepreneurial spirit, and moral values. The effectiveness of digital entrepreneurship is influenced by managerial capabilities, technological literacy, and social mechanisms such as trust and knowledge sharing, which are naturally strong in the pesantren culture (Espina-Romero et al., 2024) . Digitalization without a strategic direction has the potential to result in fragmented entrepreneurial activities (Zhao et al.,2023). Strategy theory suggests that strategy articulation serves to direct the attention of organizations in dynamic and uncertain environments. Structured entrepreneurial education in pesantren is capable of shaping innovative, proactive, and economically independent behavior. The integration of strategy, digital capabilities, and pesantren values leads to the formation of the Digital Santripreneurial Ecosystem Model, which is a religious value-based entrepreneurship system reinforced by digital technology and oriented towards sustainability and the achievement of SDGs (Camodeca & Almici, 2021).

3. Method

This study uses a qualitative case study design to capture the complex dynamics of digital transformation and institutionalization of entrepreneurship in Islamic boarding schools (Ma'Arif et al., 2023). Two boarding schools were selected based on their active involvement in entrepreneurship programs and digital adoption initiatives. Data were collected through in-depth semi-structured interviews with pesantren leaders, santripreneurs, business unit managers, entrepreneurial alumni, and supporting partners. Participant observation was conducted during business operations, digital marketing activities, and entrepreneurship training sessions. Institutional documents including financial reports, digital content, curriculum materials, and strategic plans were also analyzed. Triangulation was applied across data sources, methods, and theoretical perspectives (Ma'Arif et al., 2023). Thematic analysis involved open coding to identify emerging categories, axial coding to establish relationships between themes, and selective coding to construct an integrated theoretical explanation.

4. Results And Discussion

Result

The results of the study show that the economic independence of Islamic boarding schools in Bogor Regency is generally still in a transitional stage towards institutional sustainability. Most Islamic boarding schools are not yet fully economically independent and still depend on traditional sources of funding such as contributions from students, infaq, alms, waqf, as well as assistance from the government and external donors. This condition places Islamic boarding schools in the pre-independent to semi-independent category, where economic activities have begun to develop but have not yet become the main foundation for institutional sustainability. Islamic boarding school

business units have actually been formed, including cooperatives, canteens, agriculture, livestock, and student micro-businesses. However, the contribution of these business units to the income of Islamic boarding schools is still relatively small. These businesses function more as a complement to educational activities than as a strategic source of income. Business management is still carried out in a simple manner, without systematic business planning, professional financial records, or measurable performance evaluations. Most of the managers of these business units are pesantren administrators who do not have a background in business management, making it difficult for the scale of the business to grow.

The level of economic independence of Islamic boarding schools is also heterogeneous. This variation is influenced by several main factors, namely the leadership of the kiai or caretaker, access to business networks and digital technology, human resource capacity, and the location of the boarding school (urban and rural). Several Islamic boarding schools have demonstrated good practices through the development of agribusiness, halal cuisine, and product marketing through social media, but the managerial approach still tends to be traditional and has not been integrated with the long-term economic vision of the Islamic boarding school. The role of santripreneurs in the economic development of Islamic boarding schools is also still limited. Student entrepreneurial activities have begun to emerge as individual or small group initiatives, but have not been institutionalized in the curriculum or formal coaching system. As a result, the economic impact of santripreneurs on the overall independence of pesantren is not yet significant. Digitalization is still understood as a simple marketing tool, not as an economic transformation strategy. The absence of a clear digital strategy has resulted in digital entrepreneurship practices being partial and not yet significantly improving operational efficiency or business scale.

However, findings from a case study at Al-Ashriyyah Nurul Iman Islamic Boarding School in Bogor show a different model. This boarding school has developed integrated business diversification from upstream to downstream with dozens of interconnected business units. This integrated economic model has reduced production costs, increased efficiency, and reduced dependence on external assistance. The pesantren is positioned not only as an educational institution but also as an economic ecosystem based on productive waqf. The principle of circular economy is applied through the utilization of all resources so that waste is seen as a potential economic value. In this model, santri are placed as the main subjects of economic development. All students are required to participate in business practices, internships, and business service in the real sector, such as agriculture, manufacturing, and MSMEs. The learning by doing approach shapes the character of independence, responsibility, and courage to take risks. Entrepreneurship education is not theoretical but based on direct experience. The orientation of education is directed at creating jobs, not just producing job seekers.

Digitalization also plays an important role in pesantren governance. In addition to digital marketing and online transactions, pesantren have developed cashless financial systems based on internal software that allows all transactions to be recorded transparently and audited. Digitalization in this context is not only an operational technology, but also an instrument of good governance that enhances accountability and institutional trust. The economic sustainability of Islamic boarding schools is also strengthened through productive waqf and ZISWAF systems that are integrated with business units. Strategic assets such as land and gardens are donated as waqf so that they are not inherited consumptively, but rather managed to generate long-term income. This approach demonstrates the transformation of waqf from a traditional charitable practice to a sustainable economic instrument that supports education and social welfare across generations.

Visionary leadership is a key factor in the success of this model. Pesantren leaders play a role in building an organizational culture based on the values of honesty, responsibility, and independence. This transformational leadership strengthens the legitimacy of pesantren as social institutions that are both and economically independent entities. The process of data triangulation through coding stages reinforces these empirical findings. In the open coding stage, five main phenomena were identified: digital marketing by santri, the formation of an entrepreneurial culture, the integration of student businesses as pesantren business units, the use of digital technology, and a focus on social sustainability. These findings indicate a shift from a traditional economic model to value- and technology-based entrepreneurship.

The axial coding stage then grouped these phenomena into four broad categories, namely business digitization, santri human resource development, pesantren business models, and SDG-based sustainability orientation. Digitization improves efficiency and market access, while entrepreneurial culture shapes the santripreneur mentality. Business integration strengthens economic independence, and sustainability orientation affirms the character of pesantren as social enterprises. Furthermore, in selective coding, all categories are integrated into the core themes of the research. These themes include the role of digitization in santripreneurship, flexible and collaborative pesantren startup business models, religious value-based santri human resource development, the application of SDG-based business principles, and the strengthening of pesantren economic independence through independent financing. Overall, data triangulation shows that the economic transformation of pesantren depends on the integration of three main elements: visionary leadership, santripreneurs as economic actors, and digitalization of governance. Pesantren that are able to integrate these three aspects demonstrate a higher level of economic independence. These findings confirm that the future of pesantren independence is not only determined by the existence of business units, but by the ability to build a digital entrepreneurship ecosystem based on social values and sustainability.

Next is the process for Data Triangulation, as follows:

Table 1. Open Coding

| No | Interview/Observation Data Quote | Initial Code |
|----|---|----------------------------|
| 1 | Pesantren markets products through <i>marketplaces</i> and social media | Digital marketing |
| 2 | Pesantren encourages students to become entrepreneurs from an early age | Entrepreneurial culture |
| 3 | Students' businesses are managed as business units of the Islamic boarding school | Business integration |
| 4 | Digital technology facilitates transactions and promotion | Technology utilization |
| 5 | Businesses are directed to be sustainable and provide social benefits | Sustainability orientation |

Source: Research Results, 2025

Table 2. Axial Coding

| Initial Code | Category | Focus of Analysis |
|--------------------------------|---------------------------------------|-------------------------|
| Digital Marketing | Business digitalization | Marketing Strategy |
| Technology Utilization | Digital Infrastructure | Business efficiency |
| Entrepreneurial culture | Development of santri human resources | Santripreneur mentality |

| | | |
|-----------------------------------|--------------------------|-----------------------|
| Business integration | Pesantren business model | Economic independence |
| Sustainability orientation | SDGs Principles | Sustainable business |

Source: Research Results, 2025

Table 3. Selective Coding

| Category | Main Theme | Subtheme |
|--|---|--|
| Business Digitalization | The Role of Digitalization for Santripreneurs | Digital platforms, online marketing |
| Pesantren business model | Pesantren Startup Business Model | Innovation, flexibility, collaboration |
| Development of santri human resources | Santripreneurs | Religious values, entrepreneurship |
| SDG Principles | SDG-Based Business | Sustainability, inclusivity |
| Economic independence | Economic Independence of Islamic Boarding Schools | Income, independent financing |

Source: Research Results, 2025

Table 4. Interview Quote Matrix

| No | Interview Quote (Raw Data) | Open Code | Subtheme (Axial Coding) | Main Theme (Selective Coding) |
|----|---|---|-------------------------------|---|
| 1 | "Currently, we have 73 businesses focusing on food, energy, water, and waste management." | Diversification of Islamic boarding school businesses | Integrated business portfolio | Economic Independence of Islamic Boarding Schools |
| 2 | "Pesantren should not depend on proposals or donations" | Anti-aid dependency | Institutional Independence | Economic Independence of Islamic Boarding Schools |
| 3 | "Students should not become civil servants; they should become entrepreneurs" | Entrepreneurship orientation for santri | Entrepreneurship education | Santripreneurship |
| 4 | "Santri learn directly in mines, rice fields, factories" | Learning through practice | Practice-based education | Santripreneurship |
| 5 | "We have our own cashless system, everything is recorded" | Pesantren cashless system | Financial digitization | Digitalization of Islamic Boarding Schools |
| 6 | "If there is cash, it goes directly into the boarding school's savings account." | Strict financial supervision | Financial transparency | Digital Pesantren Governance |
| 7 | "All operations must be professional, accountable, and transparent" | Professional governance | Good governance | Digital Governance of Islamic Boarding Schools |
| 8 | "Waqf must be productive, not just unused land ()" | Productive waqf | Islamic Social Financing | Productive Waqf & ZISWAF |

| | | | | |
|----|--|--------------------------------|----------------------------|---|
| 9 | "We store assets in the form of gold bars." | Sharia asset management | Financial Resilience | Economic Sustainability |
| 10 | "Zakat, infaq, and sadaqah are a system, not spontaneous charity" | ZISWAF System | Structured Islamic Economy | Sustainable Islamic Economy |
| 11 | "Women can be leaders, more meticulous" | Women's leadership | Gender and leadership | Visionary Leadership |
| 12 | "Free Islamic boarding schools: food, education, health care" | Free education | Social inclusion | Social Impact of Islamic Boarding Schools |
| 13 | "Boarding school students are given business capital after graduation" | Access to capital for students | Economic empowerment | Santripreneurship |
| 14 | "No waste, everything becomes money" | Circular economy | Circular economy | Pesantren SDGs |
| 15 | "We have collaborated with Bank Indonesia" | Institutional collaboration | Institutional support | Pesantren Business Model |
| 16 | "Efforts from upstream to downstream must be mastered" | Value chain integration | End-to-end business | Integrated Business Model |
| 17 | "Islamic boarding schools send students to other Islamic boarding schools to develop businesses" | Model replication | Scalability Model | Boarding School Model for Sustainable Development Goals (SDGs) |
| 18 | "No borrowing with interest, must share profits" | Anti-usury | Sharia finance | Islamic economics |
| 19 | "This business is not for personal wealth, but for the community" | Social orientation | Social entrepreneurship | Islamic boarding schools & Sustainable Development Goals (SDGs) |
| 20 | "Pesantren are centers of economic activity for the community" | Pesantren as a center | Economic ecosystems | Entrepreneurial Islamic Boarding Schools |

Source: Research Results, 2025

Table 5. Summary of Themes & Analytical Indicators

| Main Theme | Key Subthemes | Empirical Indicators |
|--|---|--|
| Economic Independence of Islamic Boarding Schools | Business diversification, anti-donation | Number of business units, independent funding sources |
| Santripreneurship | Field practice, business capital | Internships, community service, entrepreneurial alumni |
| Digitalization of Islamic boarding schools | Cashless, internal software | Transaction transparency, internal audit |

Source: Research Results, 2025

| | | |
|---|------------------------------------|---------------------------------|
| Productive Waqf & ZISWAF | Asset waqf, systemic zakat | Waqf assets, social financing |
| Visionary leadership | Women's leadership | Strategic decision-making |
| SDGs Islamic Boarding School Model | Circular economy, social inclusion | Social and environmental impact |

Table 5. Summary of Themes & Analytical Indicators Main Theme Main Sub-theme Empirical Indicators Economic Independence of Islamic Boarding Schools Business diversification, anti-donations Number of business units, independent funding sources Santripreneurship Field practice, venture capital Internships, services, entrepreneurial alumni Digitalization of Islamic Boarding Schools Cashless, internal software Transaction transparency, internal audit Productive Waqf & ZISWAF Waqf Assets, Zakat Waqf Assets Systemic, Social Financing Visionary Leadership Women's Leadership Strategic Decision Making SDGs Islamic Boarding School Model Sustainable Economy Circular economy, social inclusion Social & environmental impact Source: Research Results, 2025

Figure 4 SDGs-Based Start-up Business Model Towards Economic Independence of Islamic Boarding Schools.

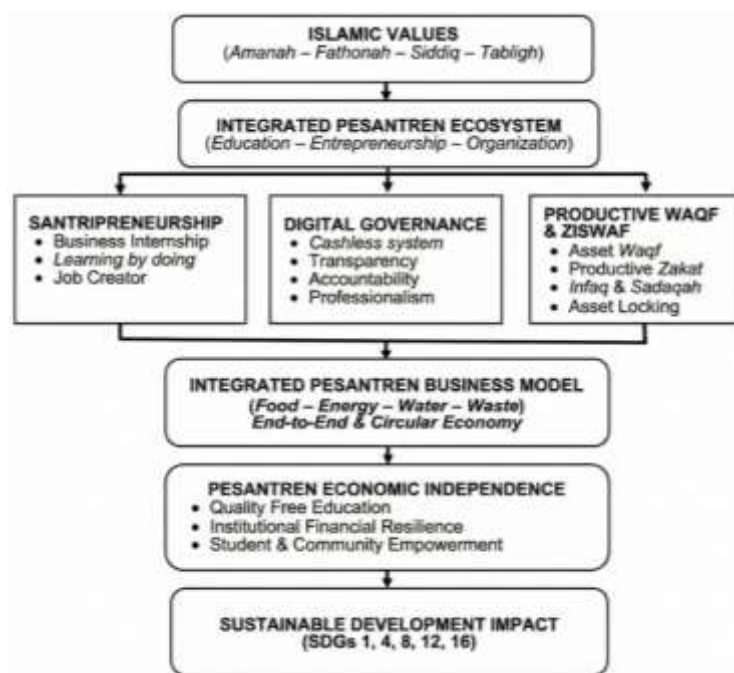


Figure 1.
SDG-Based Start-up Business Model Towards Economic Independence for Islamic Boarding Schools

Source: Research Results, 2025

Based on Figure 1, this illustrates a comprehensive framework for achieving economic independence for Islamic boarding schools, which ultimately leads to the achievement of the Sustainable Development Goals (SDGs). This process begins with the most fundamental foundation, namely Islamic Values (Amanah, Fathonah, Siddiq, Tabligh), which inspire all activities. These values then form an Integrated Islamic Boarding School Ecosystem that synergizes education, entrepreneurship, and organization. The ecosystem is supported by three main pillars that work in tandem: (1) Santripreneurship: Developing the business skills of santri (Islamic boarding school students) so that they are ready to become job creators through hands-on practice. (2) Digital Governance: Realizing a modern management system that is transparent, accountable, and professional, based on digital technology (cashless). (3) Productive Waqf & ZISWAF: Optimizing

Islamic financial instruments (zakat, infaq, sadaqah, waqf) as a source of productive funding for institutions. These three pillars are realized through an Integrated Islamic Boarding School Business Model that adopts the principles of a circular economy (zero waste), focusing on the food, energy, water, and waste management sectors. The success of this business model will result in the Economic Independence of Islamic Boarding Schools. This independence provides direct benefits in the form of financial resilience for institutions, the provision of free quality education, and the empowerment of surrounding communities. Ultimately, this entire system makes a tangible contribution to Sustainable Development Goals (SDGs), particularly in terms of poverty alleviation, quality education, economic growth, responsible consumption and production, and strong institutions.

5. Conclusion

The conclusion explains what is expected in the Introduction section, as well as conclusions from the Results and Discussion section. Conclusions can also be added to the development plan for the implementation of the future service.

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