

Media Literacy, Digital Exposure, Governance and Trust in Pesantren Sustainability: The Moderating Role of Management Openness in the Post-Truth Era

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ABSTRACT

This study investigated the sustainability of Pesantren in Indonesia amidst rising digital exposure and shifting governance demands in the post-truth era. As traditional Islamic boarding schools, Pesantren are increasingly challenged to integrate media literacy and digital tools without compromising their religious identity and educational integrity. The central issue addressed was the pressure between digital transformation and sustainable institutional governance. Guided by the Technology Acceptance Model (TAM), the study employed a quantitative survey approach, gathering data from 406 respondents across various Pesantren roles. Structural Equation Modelling (SEM-PLS) was used to analyze the influence of media literacy, digital exposure, institutional governance, and trust in social media on Pesantren sustainability, with management openness examined as a moderating variable. The results revealed that digital exposure and trust significantly enhanced management openness, positively affecting sustainability. However, media literacy and institutional regulations showed no direct impact, highlighting the critical role of leadership attitudes. This study implies that management openness and digital trust are strategic levers for sustaining Pesantren in a digitalized, post-truth society. The findings underscore the need for adaptive governance and culturally grounded digital literacy frameworks to ensure the long-term relevance and resilience of Pesantren.

Keywords: Pesantren's Sustainability, Media Literacy

ARTICLE INFO

Article History:

Received: 7 May 2025

Accepted: 9 June 2025

Available online: 1 April 2025

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INTRODUCTION

In today's rapidly evolving digital landscape, educational institutions face the challenge of integrating technology while maintaining their foundational values. In Indonesia, Pesantren, traditional Islamic boarding schools are key centres for religious education and character development. More importantly, the long-term sustainability of Pesantren now depends heavily on how effectively they manage these technological transitions while safeguarding institutional governance, leadership integrity, and educational relevance. The increasing digital exposure and the need for media literacy and structured institutional regulations present opportunities and challenges for Pesantren's management in sustaining both operational stability and religious authenticity in the post-truth era (Polanco-Levicán & Salvo-Garrido, 2022). This study, therefore, explored how media literacy, digital exposure, and institutional policies influence Pesantren's sustainability, with a particular emphasis on the role of management openness in addressing these evolving pressures.

Pesantren have long been central to Islamic education in Indonesia, fostering a strong religious foundation for students, or santri. Traditionally, these institutions relied on classical Islamic texts and a communal learning environment (Fadli & Dwiningrum, 2021). However, as digital technology permeates all sectors of life, Pesantren is increasingly exposed to modern influences. While digital tools can enhance learning and access to information, they also bring challenges such as misinformation, declining traditional values, and uncontrolled media exposure (Polanco-Levicán & Salvo-Garrido, 2022). The pressure on Pesantren management has intensified, as they must now find ways to integrate beneficial technology without compromising core religious identity or institutional legitimacy.

Media literacy has been recognized as critical in ensuring informed decision-making and sustainable educational practices (Alotaibi, 2022). A study on digital literacy in Southeast Asia found that structured digital literacy programs significantly impact students' ability to critically engage with online content, making it a crucial aspect of modern education (Judijanto et al., 2024). This highlights the urgent need to understand how Pesantren management policies and decisions regulate digital exposure while maintaining their traditional learning frameworks.

The digital transformation of education poses several critical issues for Pesantren. One of the main challenges is media literacy and digital exposure. As Pesantren students increasingly engage with digital content, there is a growing need for media literacy education to help them navigate misinformation and develop critical thinking skills (Polanco-Levicán & Salvo-Garrido, 2022). Statistics from Indonesia indicate that internet access among students aged 5–24 has surged from 33.98% to 59.3% over four years (Statistics Indonesia, 2020). This highlights the necessity of equipping Pesantren students with the skills to filter and analyze online information responsibly. Yet, the success of such initiatives largely depends on the willingness and preparedness of Pesantren leadership to adopt structured digital education policies and align them with institutional values.

Another issue involves institutional regulations. Pesantren have historically maintained strict control over external influences to preserve religious teachings. However, in the digital age, such restrictions must be balanced with enabling access to proper educational resources (Fadli & Dwiningrum, 2021). Some Pesantren hesitate to adopt digital learning due to concerns about maintaining their religious and ethical frameworks. This calls for structured policies on media usage that align with Pesantren's values while ensuring meaningful digital literacy. Management openness becomes a critical factor here, where institutions led by progressive and transparent leadership are better positioned to implement digital innovation without eroding traditional principles.

This study's core issue was the gap between digital transformation and sustainable governance practices in Pesantren. Despite increased internet accessibility and policy-level support, many Pesantren remain unprepared to sustain their institutional goals in the face of digital disruption. Poor management adaptability, rigid institutional culture, and lack of clear communication strategies hinder their ability to respond to the post-truth challenges. This highlights an urgent need to examine the management aspect of Pesantren's sustainability.

Management openness to media usage plays a pivotal role in Pesantren's sustainability by enabling the integration of digital tools without compromising religious values. When leaders are transparent, adaptable, and supportive of structured digital adoption, Pesantren are

more likely to develop effective media literacy programs, implement clear media policies, and foster critical engagement among Santri. This openness facilitates informed decision-making, enhances trust in institutional governance, and allows for the responsible use of media, factors essential for sustaining educational relevance and cultural integrity in a digital age. Thus, management openness acts as a catalyst that aligns technological innovation with Islamic educational principles, directly influencing long-term institutional resilience.

This study explores the role of media literacy among potential students and administrators, highlighting how they navigated the digital landscape to promote ethical engagement and reduce the spread of misinformation. The study also investigated the extent of digital exposure within Pesantren communities and its influence on education and governance, emphasizing the importance of balancing technological advancements with traditional values. Additionally, it analyzed the role of institutional governance in regulating media use and ensuring that digital adoption is aligned with educational and religious frameworks. Trust in social media usage was tested as a significant variable affecting Pesantren's sustainability. Critically, the study emphasized how management openness served as a moderating factor, shaping whether digital and governance efforts positively contributed to long-term sustainability or introduced further institutional risk. Finally, the study examined how management openness moderated sustainability efforts in the post-truth era, identifying strategies that effectively integrated digital tools while preserving Pesantren's core ethical and educational principles.

This study contributes significantly to advancing discussions on Pesantren sustainability, mainly through the lens of educational policy, institutional governance, and digital readiness. It supported policymakers in developing curriculum frameworks that integrated digital skills while upholding ethical and religious integrity (UNESCO, 2023). More importantly, the findings offered practical direction for strengthening institutional resilience in Pesantren by addressing leadership openness, regulatory alignment, and adaptability in the face of digital disruption. Additionally, it guided Pesantren administrators in balancing digital integration with institutional values, ensuring that students benefited from modern educational tools without compromising religious principles (Fadli & Dwiningrum, 2021). On a global scale, the research offered insights

into religious-based education models in regions such as Malaysia and Singapore, highlighting how management decisions and governance practices can determine the long-term viability and cultural integrity of faith-based institutions in the digital era (Judijanto et al., 2024).

This paper will continue with the literature review section, exploring media literacy, digital exposure, and Pesantren governance, using TAM to develop hypotheses. The methodology section will outline the research design, data collection, and analysis methods. The findings and discussion will present results, compare them with prior studies, and assess their impact on Pesantren's sustainability. Finally, the conclusion summarises key insights, provides practical and theoretical implications, and suggests future research directions.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Underpinning Theory of Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1986 and later expanded in 1989. It is a widely used theoretical framework that explains how individuals adopt and use new technologies. TAM proposes that technology acceptance is primarily influenced by two key factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which a person believes that using a particular technology will improve their performance, while perceived ease of use relates to how effortless they perceive the technology. Davis' model has been extensively applied in various fields, including education, business, and healthcare, to understand technology adoption behavior.

In the context of this study, TAM provides a valuable perspective on how media literacy, digital exposure, and institutional governance influence Pesantren's sustainability as a management and institutional performance concern. As Pesantren administrators and educators navigate the digital era, their willingness to embrace digital tools largely depends on whether they perceive them as beneficial and easy to implement. Sustainability in this context is closely tied to how well these institutions adapt digital

tools to maintain educational quality, protect religious values, and remain operationally resilient. If digital literacy tools are viewed as enhancing educational quality while maintaining religious integrity, they are more likely to be accepted. However, resistance to adoption may arise if they are seen as challenging to manage or conflicting with Pesantren's values.

Institutional governance and management openness also play a crucial role in technology adoption within Pesantren. TAM suggests that decision-makers' perceptions of usefulness and ease of use determine whether digital education policies and governance strategies will be successfully integrated. This underscores the role of Pesantren leaders' role as educators and strategic decision-makers responsible for long-term institutional sustainability. Pesantren leaders must balance media control and technological integration to ensure students benefit from digital resources without compromising religious teachings. The degree to which management is open to adopting structured digital literacy programs can significantly impact the sustainability trajectory of Pesantren, particularly in the post-truth era, where misinformation and uncontrolled digital content pose new risks to institutional integrity and student development.

TAM aligns with the broader challenges of Pesantren's sustainability in the digital age. As misinformation spreads rapidly, Pesantren requires structured policies that guide digital media use while fostering critical thinking and ethical responsibility. This study explored how media literacy, digital exposure, and governance structures affect Pesantren's ability to remain relevant, trusted, and resilient in digital transformation. By applying TAM, the research provides valuable insights into how perceived usefulness and ease of use shape Pesantren administrators' decisions, ultimately influencing their ability to sustain educational and ethical excellence in the digital landscape.

Hypothesis Development

Media literacy is crucial in improving Pesantren's sustainability by promoting the consumption of enlightened media, which enriches educational practices and strengthens community engagement. In the context of Islamic boarding schools, where traditional education must respond to modern challenges, promoting media literacy is essential to

building a resilient and enlightened student body (Ali and Halim, 2023). Through well-integrated media literacy programs, Pesantren can enhance students' critical thinking while ensuring the institution remains relevant and capable of navigating evolving digital landscapes. By integrating sustainable development objectives into their study programs, Pesantren can promote moderate Islam and cultivate a consciousness of sustainable practices among their students and broader communities (Nurhandika et al., 2024).

As digital platforms become increasingly influential, a critical understanding and responsible commitment to digital content is essential. In this context, Bustomi et al. (2023) underlined the importance of anti-hoax initiatives in Pesantren environments, arguing that improving media literacy was vital to navigating information complexities in the post-truth era. Such efforts were directly linked to institutional sustainability, as Pesantren failed to address the risk of misinformation undermining its educational credibility and cultural authority. This educational approach allowed students to discern credible information and generates a feeling of ethical responsibility toward sharing content.

In addition, Kurniawan et al. (2024) advocated integrating a Quranic framework in digital literacy programs within Madrasah, which can strengthen principles of ethical engagement. By aligning digital literacy with Islamic values, students are better equipped to engage thoughtfully with online content while remaining firm in their moral beliefs. This alignment reinforced the role of Pesantren as moral guardians. It ensured their ability to guide students in ethical digital citizenship, which is fundamental to long-term institutional trust and societal relevance. It also promoted cultural sensitivity to the dangers of disinformation, ultimately encouraging a more reflexive and responsible digital presence among students.

Bustomi et al. (2024) underlined the need to understand the cultural shocks often accompanying digital engagement. Their results suggested that media literacy initiatives can mitigate these shocks by preparing Santri to assess the information they encounter critically. This proactive approach not only supported individual development but also strengthened the cultural and operational resilience of Pesantren, ensuring their sustainability in a rapidly changing media environment. Such efforts contributed to developing individual skills and a community philosophy that values accurate information and discourages the spread of lies.

Promoting media literacy is essential for administrators to cultivate an enlightened student body. As Muslim (2024) noted, internalizing digital technology within Islamic education allowed administrators to create a supportive environment where responsible digital practices take priority. Administrative support was decisive in sustaining Pesantren's mission in the digital era, as top-down commitment to digital literacy ensures institutional coherence and long-term adaptability. This highlighted the need for intervention strategies that promote student commitment and administrative support in media mastery efforts.

Zakiah et al. (2024) illustrated how students' participation in Da'wah religious movements in digital spaces was directly linked to their media literacy skills. Students can engage in religious discourse by improving these skills and participating ethically and informally. Thus, media literacy was a tool for personal development and a strategic asset for Pesantren to sustain its influence and leadership in the broader religious community. Promoting media literacy in Pesantren offered students essential critical thinking skills and nourished ethical digital engagement throughout the community.

The hypothesis below was grounded in the TAM, where media literacy enhanced perceived usefulness and ease of use of digital tools in educational settings. As Pesantren students became more critical of media, they were more likely to see technology as beneficial and manageable, thereby supporting the adoption of technology that contributed to institutional sustainability. Thus, this study hypothesised:

H₁: Media literacy has a significant and positive effect on Pesantren Sustainability

Digital exposure significantly influenced the sustainability of Pesantren by presenting both opportunities and challenges in traditional Islamic education. On the one hand, technological integration can improve the management and cultural transformation of religious learning, allowing Pesantren to adapt to the disruptive nature of modern education (Halimah, Yusuf and Safiudin, 2024). This adaptability is essential for Pesantren to remain sustainable as an educational institution in a rapidly changing digital environment. However, concerns arise regarding the potential erosion of traditional values and educational integrity, raising questions about

whether digital advances serve as a solution or a threat to Islamic education (Nisa, Aimah and Fakhruddin, 2024). The sustainability of Pesantren thus depended on its capacity to adopt technological advancements without compromising its foundational identity and religious mission. Ultimately, the resilience of Pesantren in this digital era was based on their ability to adapt while maintaining their central educational principles (Ridho and Ladyai, 2024).

In Pesantren education, the increase in digital exposure had caused significant transformations, affecting governance and technology integration while striving to preserve traditional values. Halimah, Yusuf and Safiudin (2024) argued that the evolution of Pesantren management during the disruption era had led to a reconfiguration of educational practices, facilitating a combination of traditional religious learning with modern technological tools. This reconfiguration was a core aspect of institutional sustainability, as it determined whether Pesantren could continue to fulfil its role in religious education while embracing innovation. This integration presented opportunities and challenges as educators fight to maintain the essence of traditional teachings while adopting the efficiencies that technology could provide.

Tunago et al. (2023) discussed how technology had begun to reshape learning outcomes for Santri, introducing new trends that promised enhanced educational experiences. However, they warned that the effectiveness of these technological interventions depended mainly on the governance structures within the Pesantren, which must be adapted to support this transition. Without responsive and adaptive governance, the sustainability of these institutions was at risk, as digital integration could lead to fragmentation rather than growth. Therefore, the challenge lay in adopting technology and ensuring that these advances aligned with the pedagogical and spiritual objectives inherent in Pesantren education.

On the contrary, Nisa, Aimah and Fakhruddin (2024) highlighted that digital transformation presented both solutions and threats to Islamic education. They emphasized the need for careful balance since preserving Islamic values should not be compromised when pursuing modernization. This balance was fundamental to the long-term sustainability of Pesantren, where governance must navigate overlapping demands of tradition and

innovation. Effective governance structures that mediated between the two were, therefore, essential.

In addition, Darmini (2021) explored the influence of the Internet in the public sphere within Indonesian universities and Pesantren, underlining the dynamics of nuanced power and the social implications of digital integration. This underscored the importance of leadership capacity and governance awareness in sustaining Pesantren's relevance and public trust. The discourse surrounding governance in this context becomes fundamental since leaders in these institutions must facilitate an environment where traditional erudition thrives together with digital advances.

Hanif (2025) examined the integration of religious moderation within Islamic educational frameworks, illustrating that the digital age presented unique challenges and opportunities for governance structures in Pesantren. To ensure sustainability, these institutions must build governance frameworks that are strategic, flexible, and rooted in their religious missions. As these institutions evolve, a concerted effort is essential to ensure that governance promotes technological integration while safeguarding the central values that define Pesantren. Through strategic governance that embraces technological change while defending traditional practices, Pesantren can effectively navigate the complexities of the digital panorama and secure its sustainable future.

According to TAM, the degree of digital exposure reflects users' interaction with technology that shapes their perceptions of usefulness and ease of use. In the Pesantren context, greater exposure may enhance familiarity and confidence with digital tools, thereby improving technology acceptance and contributing to sustainable practices. Hence, this study hypothesised:

H₂: Digital exposure has a significant and positive effect on Pesantren Sustainability

Institutional governance significantly influences Pesantren's sustainability, mainly through the lens of management practices, policy structures, and community involvement. Responsive management practices, such as those observed in the Green Pesantren program, illustrated how

environmental sustainability could be integrated into educational structures (Kasanah, Sajjad and Rohmatullah, 2023; Erum, Musa, Tufail, Said, and Zakaria, 2024). In addition, developing agricultural resource management structures in Pesantren highlighted the importance of adaptive policy structures that supported sustainable practices (Pradini, Alikodra, Hasim and Pranadji, 2017). These initiatives reflected the broader governance capacity of Pesantren to align institutional policies with long-term educational, environmental, and cultural goals. Effective governance in Pesantren is also crucial to improving the quality of Islamic education, as shown in several studies on managing these institutions (Museafa, Akhyak and Aziz, 2025). As such, sustainability in Pesantren was closely linked to the ability of their institutional governance to balance internal values with external demands for modernization.

As digital adoption becomes increasingly widespread, the convergence of technology and governance requires an examination of the regulatory frameworks that guide the consumption and spread of media. Howard (2010) maintained that information technology can be a double-edged sword in political contexts, promoting democratic commitment and authoritarian practices. This duality resonates within the Pesantren context, where digital tools must be regulated to support ethical use while safeguarding the moral and religious integrity of the institution. This reflects how different religious cultures and institutions perceive and regulate widespread digital access.

The role of educational institutions in this governance framework is crucial. Sahlan et al. (2022) highlighted the need for digital literacy, particularly in public education, to encourage religious moderation. The study underlines that educational systems must adapt to the digital era and embrace technologies that align democratic values with religious teachings. In the context of Pesantren, this adaptation must be rooted in firm governance, where policies are carefully crafted to ensure that digital transformation enhances, not undermines, the institution's sustainability and values. In line with this, Subchi et al. (2022) investigated the impacts of new media on religious messaging, revealing the exploitation of women's imagery to spread religious messages that resonate with the contemporary public. This reflected a shift in discourse and indicates how institutional governance can adapt religious teachings to modern technological landscapes. For Pesantren, managing this shift is critical to maintaining relevance and authority in educational and social spaces.

The relationship between technology and religious identity has been explored in a complex way in the works of Barzilai-Nahon and Barzilai (2005), who noted that the Internet can serve as a tool for religious fundamentalism and as a platform for more expansive cultural expression. For Pesantren, this dual role presented both a threat to their core values and an opportunity to extend their influence, depending on how governance structures manage this space. Campbell and Bellar (2022) further contributed to this discourse by examining how digital engagement had remodelled religious practices and communities in ways that required new regulatory approaches in institutional governance. This transformation was particularly relevant to Pesantren leaders tasked with guiding the institution through evolving digital realities while preserving its foundational mission.

As institutional governance continues to shape media regulation, it must align digital adoption with educational values and religious principles to promote balanced and inclusive digital citizenship. For Pesantren, this alignment is desirable and essential for institutional sustainability. The interaction of technology, governance, education, and religion indicates a complex landscape that requires continuous assessment and adaptive policies to ensure beneficial outcomes for the institution and its community.

In relation to TAM, institutional governance shapes the environment in which perceived ease of use and usefulness are formed through policy structures and administrative clarity. Strong governance provides the support and consistency necessary for technology acceptance among educators and students, making sustainability goals more achievable. Hence, this study hypothesised:

H₃: Institutional governance has a significant and positive effect on Pesantren Sustainability

Confidence in social networks plays a pivotal role in supporting Pesantren's sustainability by reinforcing community engagement, enhancing the dissemination of educational content, and helping institutions navigate the balance between traditional values and modern technological realities. The emergence of digital platforms has transformed internal and external communication within these Islamic boarding schools, facilitating stronger ties among stakeholders. Sutomo et al. (2024) argued that religious

social networks can strengthen social capital within Pesantren, which directly correlates with greater community trust and active participation in institutional programs. This trust and connectedness are essential foundations for institutional resilience and long-term sustainability, as they ensure continued stakeholder investment in Pesantren's mission and development.

In addition, social networks serve as a fundamental tool for expanding educational reach in Pesantren, enabling institutions to distribute knowledge and share resources more effectively. Asmendri et al. (2024) illustrated how transformational leadership within Islamic education can leverage social media to amplify educational initiatives. This strategic use of digital platforms enhanced Pesantren's visibility. It strengthens its reputation as a center of learning, vital for attracting students, funding, and institutional partnerships necessary for sustainability (Zakaria, 2009). Improved outreach through social networks can lead to increased enrolment and broader community support, both key to the long-term viability of these institutions.

However, integrating modern technology into Pesantren must be guided by a strong commitment to preserving core religious values. Purnomo et al. (2024) highlighted the importance of a prophetic approach that balances technological innovation with environmental and religious education. This framework allowed Pesantren to adopt modern practices while staying true to their foundational beliefs. Pesantren leadership can foster a moderate and sustainable society by integrating environmental stewardship with Islamic teachings. This approach enhanced institutional credibility and trust and strengthens Pesantren's relevance in addressing contemporary social and ecological challenges.

The nexus of trust and social networks also contributes to Pesantren's environmental and institutional sustainability. Alam et al. (2024) discussed how blending religious principles with Da'wah efforts via social media can foster environmentally conscious behavior within the community. The trust cultivated through these digital interactions motivated collective participation in sustainability practices, ultimately reducing the ecological footprint of Pesantren and reinforcing its mission of social responsibility.

Falah et al. (2023) argued that communication, as explained through the Social Cognitive Theory, showed that trust in social networks enhances social interaction and collaboration. This dynamic improves educational outcomes and strengthens the community's resilience, ensuring that Pesantren remains relevant in rapid social and technological changes. Therefore, trust in social networks was not merely a communication tool, it was a strategic asset for sustaining Pesantren through community participation, educational advancement, and the responsible integration of technology with traditional Islamic values.

This hypothesis aligned with the TAM construct, as trust in social networks can influence users' perceived ease of navigating digital environments and the usefulness of digital interactions for learning. Such trust enhances digital acceptance and engagement, both critical for sustaining the Pesantren's educational mission. Thus, this study hypothesised:

H₄: Trust in Social Media Usage has a significant and positive effect on Pesantren Sustainability

Management attitude and digital integration are key determinants of Pesantren's sustainability, directly shaping how these institutions adapt to change while preserving their religious foundations. Management openness, defined by transparency, collaborative decision-making, and responsiveness, encouraged an environment where digital tools can be effectively adopted without compromising ethical educational values. According to Kusuma, Muharom and Jandra (2025), the successful digital transformation in Pesantren was rooted mainly in adaptive management practices that embraced both innovation and tradition. Such adaptability was crucial to sustaining Pesantren as a relevant, responsive, and spiritually grounded institution in the modern era.

The transformation of religious learning culture in the digital age was strongly influenced by management's willingness to embrace change, which facilitated the acceptance and use of digital tools (Halimah, Yusuf and Safiudin, 2024). When leadership is inclusive and supportive, stakeholders—educators, students, and community members are more open to engaging with new technology. This was particularly critical in Pesantren settings where preserving religious teachings is central. In this context, digital tools

must enhance educational delivery while protecting the sanctity of Islamic values, thereby reinforcing the institution's sustainability mission.

In addition, integrating Islamic values with environmental ethics demonstrated the importance of a holistic educational approach in Pesantren (Syukri et al., 2023). An administration that embraces openness enables dialogue on how digital practices can be aligned with Islamic ethical principles, creating a sustainable and morally conscious learning environment. Such integration reinforces Pesantren's role as a place of religious instruction and a socially responsible institution capable of leading sustainable change. Strategies that will strengthen learning behavior based on Islamic values were also essential to institutional resilience, as highlighted by Khoirunnisak et al. (2023).

Governance transformation within Islamic education was essential for improving institutional effectiveness and accessibility in the digital age (Ernawati, Saputra and Kurniawan, 2024). These transformations, driven by open and forward-thinking management, enabled Pesantren to remain sustainable amid educational, technological, and cultural shifts. Therefore, the synergy between management openness and digital integration was not only desirable but necessary for the sustainability and ethical continuity of Pesantren in a rapidly evolving educational landscape.

This hypothesis reflects a TAM-based moderation, where management openness can enhance or constrain the perceived usefulness and ease of use of technology across the institution. When leadership is transparent and collaborative, the acceptance of digital innovations rooted in media literacy and governance frameworks becomes more likely, reinforcing Pesantren sustainability. Thus, the study hypothesised that:

H₅: Management openness moderates the relationship between media literacy, digital exposure and governance to Pesantren sustainability

METHODOLOGY

Research Design

This study employed a quantitative research design using a survey method to examine the influence of media literacy, digital exposure, institutional governance, and management openness on Pesantren's sustainability. Using a structured quantitative approach ensured standardized data collection and allowed the researchers to systematically assess both direct and moderating effects. The variables were grounded in relevant theoretical frameworks and aimed at capturing the operational, ethical, and cultural factors shaping Pesantren's resilience in the digital era.

Sample

This study was limited to Pesantren within Java Island, which may not reflect conditions across Indonesia's broader Islamic educational landscape. Caution is advised in generalizing these results nationally. The target population included teachers (Ustaz), administrators, Kyais, and Santris from multiple Pesantren across the island of Java, Indonesia. These respondents were selected based on their active participation in digital learning environments and governance structures. 600 questionnaires were distributed, and 406 completed responses were collected, resulting in a 67.8% response rate. This sample provided a representative mix of stakeholders with varied age groups, educational backgrounds, and roles, contributing to a more holistic analysis of sustainability dynamics in Pesantren.

Data Collection

Data were collected using a self-administered structured questionnaire designed to align with the study's core constructs. The first section of the instrument gathered demographic information, including respondents' age, gender, educational background, and roles within the Pesantren. This was followed by several thematic sections measuring key variables central to the sustainability of Pesantren.

The section on media literacy focused on the respondents' ability to critically assess, interpret, and verify the credibility of online content,

reflecting their preparedness to engage with digital information ethically. The digital exposure component assessed the extent and frequency of digital tool usage across learning, teaching, and administrative activities within the Pesantren, capturing how integrated technology has become in daily operations. Institutional governance items were designed to evaluate the policies and regulatory mechanisms that guide the use of media and digital tools, ensuring that such integration does not compromise religious values. Finally, the section on management openness measured the degree to which Pesantren's leadership exhibits transparency, adaptability, and responsiveness in embracing digital transformation while upholding Islamic ethical standards. All items were rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), ensuring consistency in response measurement. All items were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument was pre-tested to ensure clarity, reliability, and cultural relevance.

Data Analysis

The collected data were first screened for completeness and consistency before further analysis. Descriptive statistics were used to summarize respondents' demographic distribution and digital engagement patterns. Structural Equation Modelling - Partial Least Squares (SEM-PLS) was applied for inferential analysis using SmartPLS software. This method enabled testing of the hypothesized relationships between constructs and the moderating role of management openness in influencing Pesantren's sustainability. Validity and reliability were verified through Cronbach's Alpha, Composite Reliability, and AVE, ensuring the measurement model's robustness.

FINDINGS AND DISCUSSION

Descriptive Results, n=406

Table 1: Descriptive Results

		Number	Percentage
Gender	Female	175	43.1
	Male	231	56.9
Age Group	18 - 25	139	34.2
	26 - 40	99	24.4
	Below 18	168	41.4
Role	Administrator	56	13.8
	Kyai	84	20.7
	Santri	223	54.9
	Ustaz	43	10.6
Education	Diploma	99	24.4
	Secondary School	307	75.6
Years	1 . 5 years	96	23.6
	6 . 10 years	99	24.4
	Less than 1 year	112	27.6
	More than 10 years	99	24.4
Access	Daily	121	29.8
	Frequently	208	51.2
	Occasionally	76	18.7
	Rarely	1	0.2
Guidelines	Not Sure	65	16.0
	Yes	341	84.0

The collected data were analyzed using descriptive statistics and inferential analysis, including correlation and regression tests, to examine relationships between variables. Structural Equation Modelling (SEM) was used to test the hypothesized relationships and determine the moderating role of management openness in shaping Pesantren’s sustainability amid the digital transformation.

The demographic data as in Table 1 revealed that the sample comprised a majority of male respondents (56.9%) compared to females (43.1%), suggesting a potential influence of gender on perspectives towards media literacy and digital engagement. Notably, a significant portion of the respondents were below 18 (41.4%), with the next largest group aged between 18 and 25 (34.2%). This youthful demographic represented a

critical stakeholder group in determining the sustainability of Pesantren, as their familiarity with digital environments directly affected how Pesantren must adapt its educational and governance strategies. Their expectations and interactions with media could significantly influence perceptions of institutional relevance, trust, and responsiveness.

In terms of roles, the majority were Santri (students), constituting 54.9% of the respondents, followed by Kyai (scholars) at 20.7%, administrators at 13.8%, and Ustaz (teachers) at 10.6%. This distribution underscored the importance of student perspectives in sustaining Pesantren's institutional development, as their experiences and feedback provided insights into how well current practices support both traditional learning and modern adaptation. The educational background showed a predominant completion of secondary school (75.6%), suggesting varying levels of critical thinking and exposure to digital literacy skills among the respondents factors crucial for evaluating how sustainable digital integration is within Pesantren frameworks.

The years of association with the Pesantren were evenly spread across categories, indicating a balanced representation of newer and long-standing community members. This balance allowed evaluation of how sustainability perceptions differ between short-term and long-term exposure to institutional culture, management practices, and digital engagement. Most respondents reported frequent (51.2%) or daily (29.8%) access to digital media, reflecting a high level of engagement with digital platforms. This degree of exposure indicated that for Pesantren to remain sustainable, its leadership must align institutional policies and learning strategies with the digital realities of its stakeholders.

Additionally, the high level of awareness about guidelines (84%) suggested that respondents were generally informed about Pesantren's rules and management policies. This awareness was a foundational element of sustainability, as it reflected the transparency and communication effectiveness of institutional governance, areas directly influenced by management openness. Understanding how informed the community was can help determine how receptive Pesantren were to change and how effective they were at guiding digital transformation while maintaining Islamic educational integrity.

Table 2: Outer Loading Validity Test

	Outer loading
DME1 <- DME	0.933
DME2 <- DME	0.941
IRM2 <- IRM	0.912
IRM3 <- IRM	0.699
IRM4 <- IRM	0.919
MLA1 <- MLA	0.929
MLA2 <- MLA	0.924
MLA3 <- MLA	0.837
MMO2 <- MMO	0.815
MMO3 <- MMO	0.912
MMO4 <- MMO	0.828
PPS1 <- PPS	0.737
PPS1 <- PPS	0.890
PPS1 <- PPS	0.903
PPS1 <- PPS	0.909
TMS1 <- TMS	0.927
TMS2 <- TMS	0.949
TMS3 <- TMS	0.893
TMS4 <- TMS	0.927

Notes:

DME: Digital Media Exposure; IRM: Institutional Regulations on Media Use; MLA: Media Literacy Awareness; TMS: Perceived Trust in Social Media Information; MMO: Management Openness; PPS: Pesantren Sustainability

The validity test results, as shown in Table 2, indicated that Cronbach’s Alpha values met the acceptable threshold of 0.7, confirming that all variables used in the study were reliable. The accepted composite reliability value was greater than 0.7, while values between 0.6 and 0.7 remained acceptable for exploratory research. Based on the composite reliability results, all constructs exceeded the 0.7 benchmark. This indicated strong internal consistency among the variables used to measure factors critical to Pesantren’s sustainability, such as media literacy, digital exposure, governance, trust, and management openness. Therefore, it was concluded that the measurement constructs in this study were reliable and suitable for analyzing sustainability dimensions in Pesantren contexts.

There are two types of validity in PLS-SEM: convergent and discriminant. Convergent validity refers to the extent to which a set of indicators represents a single latent construct and effectively supports it. This unidimensionality is demonstrated through the Average Variance Extracted (AVE), with a minimum required value of 0.5 (J.F. Hair et al., 2017). All constructs met this requirement based on the test results in Table 2. These findings affirmed that the instruments used were valid for evaluating the structural relationships that influenced the sustainable development of Pesantren, particularly in the areas of digital adaptation, ethical governance, and stakeholder engagement.

Table 3: Fornell-Larcker Criterion Discriminant Validity Test

	DME	IRM	MLA	MMO	PPS	TMS
DME	0.937					
IRM	0.234	0.849				
MLA	0.131	-0.026	0.898			
MMO	0.445	0.236	0.075	0.853		
PPS	0.419	0.263	0.004	0.383	0.873	
TMS	0.375	0.624	-0.014	0.355	0.441	0.924

Notes:

DME: Digital Media Exposure; IRM: Institutional Regulations on Media Use; MLA: Media Literacy Awareness; TMS: Perceived Trust in Social Media Information; MMO: Management Openness; PPS: Pesantren Sustainability

Based on Table 3 discriminant Validity test results, all latent constructs had the highest FLC values on their latent construct compared to other constructs.

The determination coefficient was assessed by examining the R-Squared statistical value for each variable relationship.

Table 4: Coefficient Determinant Test

	R-Squared
MMO	0.241
PPS	0.147

Notes:

MMO: Management Openness; PPS: Pesantren Sustainability

It can be observed from Table 4 that the R-Squared values for the MMO and PPS variables were 0.241 and 0.147, respectively. These values indicated that the variables DME, IRM, MLA, and TMS contributed to explaining the MMO variable by 24.1%, while other variables outside the model explained the remaining 75.9%. Additionally, the PPS variable was explained by DME, IRM, MLA, and TMS by 14.7%, whereas other variables outside the model accounted for the remaining 85.3%.

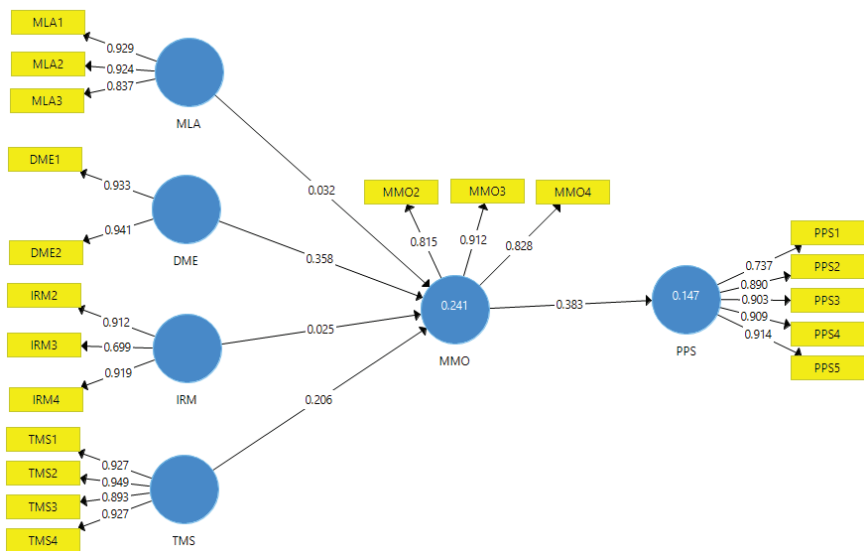


Figure 1: Hypothesis Results

Table 5: Summary Results

Hypothesis	Coefficient	Std Dev	t –test	P-value	Summary
DME → MMO	0.358	0.048	7.419	0.000	Supported
IRM → MMO	0.025	0.059	0.419	0.676	Not Supported
MLA → MMO	0.032	0.054	0.591	0.554	Not Supported
MMO → PPS	0.383	0.047	8.165	0.000	Supported
TMS → MMO	0.206	0.059	3.471	0.001	Supported

Notes:
DME: Digital Media Exposure; IRM: Institutional Regulations on Media Use; MLA: Media Literacy Awareness; TMS: Perceived Trust in Social Media Information; MMO: Management Openness; PPS: Pesantren Sustainability

Table 5 and Figure 1 show that the effect of Digital Media Exposure (DME) on Management Openness (MMO) was statistically significant, with a p-value of 0.000, indicating strong support for the hypothesis. Conversely, the effect of Institutional Regulation on Media (IRM) on MMO had a p-value of 0.676, and Media Literacy Awareness (MLA) on MMO yields a p-value of 0.554 both above the 0.05 threshold, resulting in their respective rejections. The influence of Trust in Media and Social Platforms (TMS) on MMO was also significant ($p = 0.001$), validating the hypothesis. Additionally, the impact of Management Openness (MMO) on Pesantren Sustainability (PPS) was strongly supported with a p-value of 0.000.

These findings were consistent with the TAM, which posited that perceived usefulness and ease of use significantly affect users' acceptance of technology (Davis, 1989). In this study, digital media exposure and trust in social media were reflected as enablers of perceived usefulness and trust, which positively influenced management openness. Management openness, in turn, was essential for enabling the successful implementation and integration of digital tools, which ultimately supported the sustainability of Pesantren.

The strong influence of DME ($\beta = 0.358, p = 0.000$) on MMO supported the view of Halimah, Yusuf, and Safiudin (2024) that adaptive leadership in Pesantren helped blend tradition with technological advancement. TMS ($\beta = 0.206, p = 0.001$) aligned with the findings of Sutomo et al. (2024), who emphasized the power of digital networks in enhancing institutional trust and social capital. These results suggested that Pesantren leaders' openness to digital tools depends significantly on their trust in the platforms and the perceived benefits of digital exposure, two core constructs within TAM.

On the other hand, the insignificant effects of IRM and MLA may reflect practical implementation gaps, where formal policies and literacy efforts were not yet effectively influencing institutional behavior. While MLA and IRM were theoretically necessary, the findings echoed Purnomo et al. (2024), who argued that without prophetic leadership and ethical alignment, policy and literacy initiatives alone may not drive transformational change in religious settings.

The lack of significant influence from media literacy (MLA) and institutional regulation (IRM) on management openness may reflect a gap between policy and practice. It is possible that such initiatives exist in form but lack execution or visibility among stakeholders, especially in traditionally structured institutions. Future interventions must emphasize implementation quality, not just policy presence.

Notably, MMO's positive and significant effect on PPS ($\beta = 0.383$, $p = 0.000$) confirmed the central role of management openness in sustaining Pesantren institutions. This aligned with Kusuma, Muharom, and Jandra (2025) argument that effective digital transformation requires transparent, inclusive, and responsive leadership. According to TAM, such leadership reflects favourable perceptions of digital integration and facilitates institutional adaptation.

This model validated that fostering digital exposure and trust in digital media enhanced management openness, which drove Pesantren's sustainability. While relevant, institutional regulations and media literacy must be more effectively operationalized to influence openness in practice. These results highlighted the importance of shaping managerial mindsets and digital trust as strategic levers for sustaining educational institutions like Pesantren in the post-truth era.

CONCLUSION

Summary of the Research

This study examined the impact of several key factors on the sustainability of Pesantren by exploring the relationships between media literacy, digital exposure, institutional governance, trust in social media, and management openness in influencing Pesantren's sustainability in the digital era. Using SEM-PLS analysis, the findings demonstrated that digital media exposure and perceived trust in social platforms significantly affected management openness, which strongly influenced Pesantren's ability to sustain its educational and religious mission. However, institutional regulations and media literacy awareness did not show a statistically significant effect on management openness. This suggested that structural governance alone was insufficient to ensure Pesantren's sustainable development in a digital context.

Contribution of the Study

The study contributes to the growing literature on Islamic education by contextualizing the TAM within the unique setting of Pesantren's sustainability. It highlighted how openness among leadership mediates the impact of digital influences and underscores the critical role of trust in digital platforms. This research offers practical guidance for strengthening Pesantren's governance and adaptability, advocating for a model that balances digital integration with traditional values. It also supports the development of culturally aligned digital literacy programs that can help safeguard Pesantren's sustainable identity in an evolving media environment.

Limitation of the Study

While the study provided robust insights, it was limited by its geographic focus on a single country context and its reliance on cross-sectional survey data. The use of self-reported questionnaires may have also introduced response bias. Moreover, while the model explained key relationships among variables, other external factors such as financial capacity, infrastructure readiness, and community influence were not included in the framework but may also play important roles in supporting Pesantren's long-term sustainability.

Recommendation for Future Research

As a practical recommendation, Pesantren leaders should consider incorporating structured digital literacy modules aligned with Islamic values. National Islamic education authorities could introduce a policy framework guiding ethical digital media use in faith-based schools. Leadership development programs focused on digital trust and governance innovation are also recommended.

Future research should consider expanding the scope to include comparative studies between Pesantren in different regions or countries to enhance generalizability. Longitudinal data could provide a better understanding of how sustainability practices evolve in Pesantren over time. Additionally, future models could incorporate other moderating variables such as leadership style, technological infrastructure, or socio-economic background to gain a more comprehensive view of the factors influencing Pesantren's sustainability in the post-truth digital era.

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