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Pesantren Contributions to the Sustainable Development Goals: An Empirical Analysis of Islamic Boarding Schools and SDGs 3, 4, and 16 in Indonesia

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ABSTRACT

This study examines how Indonesian Islamic boarding schools (pesantren) contribute to three Sustainable Development Goals — SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 16 (Peace, Justice and Strong Institutions) — and identifies the institutional conditions under which these contributions intensify. A convergent parallel mixed-methods design was employed. Quantitative data were gathered from 144 kiai and managers, 480 santri, and 240 alumni across 48 pesantren in five Indonesian provinces. Partial Least Squares Structural Equation Modeling (PLS-SEM) tested a framework integrating resource-based view, religious moderation, and social capital. Thirty-two in-depth interviews were thematically analysed with NVivo 14. Pesantren institutional capacity significantly mediates the impact of resource endowment ($\beta = 0.39$, $p < 0.001$), religious moderation ($\beta = 0.48$, $p < 0.001$), and community engagement ($\beta = 0.43$, $p < 0.001$) on a composite SDG contribution score. The strongest specific paths emerge for SDG 4 (skills and global-citizenship education) and SDG 16 (religious moderation and accountable governance), while SDG 3 contributions are constrained by persistent WASH deficits in salafi and rural pesantren. Pesantren typology moderates the relationship, with integrated and modern pesantren consistently outperforming traditional and salafi ones on all three SDGs. Cross-sectional design and purposive sampling limit causal inference and external generalisability; longitudinal studies across all 38 provinces are needed

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INTRODUCTION

In July 2025, Indonesia presented its fourth Voluntary National Review (VNR) on the Sustainable Development Goals (SDGs), reporting that 61.4 percent of national SDG indicators had been achieved (Prabowo Subianto, 2025). Yet, beneath this aggregate, progress on SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 16 (Peace, Justice and Strong Institutions) remains uneven, with rural and peripheral populations disproportionately left behind (UNDP/UNODC/OHCHR, 2023). Reaching the estimated four-out-of-five Indonesians who identify as Muslim will require mobilising not only the state but also the institutional infrastructure of civil society, and among the most consequential of these institutions are the pesantren — Indonesia's indigenous Islamic boarding schools.

Data from the Ministry of Religious Affairs indicate that as of the first half of 2023 there were approximately 39,551 pesantren serving around 4.9 million santri (Antara News, 2025; Kuras Institute, 2024). Although historically associated with classical Islamic learning, pesantren increasingly function as multi-purpose institutions that combine religious education, community service, economic empowerment, and — in the post-2002 Bali bombing era — peace-building and deradicalisation work (Fadhila, 2018; Firmansyah, 2025). Law No. 18 of 2019 on Pesantren formalised this expanded mandate, obliging local governments to support pesantren in their educational, da'wah, and community-empowerment functions (Wardhana, 2023; European University Digital Library, 2020). The result is a religious institution uniquely positioned to advance multiple SDGs at once.

Despite this institutional potential, three gaps in the literature motivate the present study. First, existing research tends to address pesantren contributions to individual SDGs — most commonly SDG 4 (quality education) — without examining how a single pesantren can simultaneously advance health, education, and peace outcomes (Hile, 2026; Lubis, 2023). Second, while the concept of religious moderation (wasathiyah) is widely invoked as a peace-building resource (Fadhila, 2018; Scribd, 2024), it has rarely been operationalised as a measurable construct within quantitative SDG models. Third, the institutional heterogeneity of pesantren — traditional (salaf), modern (khalaf), salafi (puritan), and integrated tahfiz–modern hybrids — has not been systematically linked to differential SDG performance. The result is a fragmented evidence base that policymakers find difficult to translate into targeted interventions.

These gaps are consequential beyond the academic community. Indonesia's 2017–2030 SDG roadmap, coordinated by the Ministry of National Development Planning (Bappenas), explicitly identifies religious institutions as partners in achieving the 2030 Agenda (Bappenas, 2024). Yet without rigorous evidence on which pesantren programmes contribute to which SDG targets, public investment risks being misdirected. Filling this evidence gap is therefore an act of both scholarly and policy relevance, particularly for a country whose Muslim population — approximately 242 million — is the largest in the world (Pew Research Center, 2024).

1.1 Research Questions

The study poses three guiding research questions. (1) To what extent do Indonesian pesantren contribute to SDG 3, SDG 4, and SDG 16, and how do these contributions vary across pesantren typologies and regions? (2) What institutional conditions — resource endowment, religious moderation, and community engagement — explain variation in pesantren SDG contributions? (3) How does pesantren institutional capacity mediate the relationship between antecedents and SDG outcomes, and what role does the regulatory environment play as a moderator? Answering these questions advances theoretical conversations about religion and development and offers actionable guidance for pesantren leaders, ministries, and development partners.

1.2 Research Objectives

The specific objectives are: (a) to develop and validate a multidimensional instrument measuring pesantren contributions to SDGs 3, 4, and 16; (b) to test a conceptual model linking pesantren antecedents (resource endowment, religious moderation, community engagement) to a composite SDG contribution score through institutional capacity as a mediator; (c) to map specific pesantren programmes to SDG targets in order to identify scalable practices; and (d) to derive strategic and policy implications for pesantren accreditation, partnerships with health and education authorities, and the integration of religious institutions into national SDG governance.

1.3 Contributions of the Study

The study makes three contributions. Theoretically, it integrates the resource-based view, religious moderation theory, and social capital theory into a single mediation model that extends each into the religious-institutional context of development. Empirically, it provides original mixed-methods evidence from 48 pesantren across five provinces, capturing institutional heterogeneity rather than relying on isolated case studies. Practically, it offers policymakers and pesantren leaders a strategic quadrant matrix and a programme–SDG heatmap that translate findings into actionable interventions. The remainder of the article proceeds as follows: Section 2 reviews the literature and develops hypotheses; Section 3 describes the methodology; Section 4 reports results; Section 5 discusses findings; Section 6 addresses limitations and counterarguments; and Section 7 concludes with implications.

LITERATURE REVIEW

2.1 Pesantren as Multifunctional Institutions

Pesantren are the oldest form of indigenous Islamic education in Southeast Asia, with roots tracing back to the late sixteenth century. Structurally, a pesantren comprises five core elements: the kiai (charismatic teacher-leader), santri (students), kitab kuning (classical Arabic texts), the mosque, and the pondok (dormitory). This configuration generates a tightly bound community in which religious, educational, and economic life are intertwined (Dhofier, 2011). Although early scholarship emphasised pesantren as centres of textual

transmission, recent studies document their growing role as agents of public health, civic education, and peace-building (Scribd, 2024; Hile, 2026). Law No. 18 of 2019 on Pesantren formalised this expanded mandate, recognising pesantren as educational, da'wah, and community-empowerment institutions and obliging local governments to provide budgetary support (Wardhana, 2023).

This multifunctionality positions pesantren as natural partners for the SDG agenda. Unlike secular schools, pesantren host dormitory residents whose daily lives — eating, sleeping, praying, learning — are organised within the institution. This creates the operational scale at which health, education, and peace interventions can be delivered. Yet the multifunctionality is also unevenly distributed. Traditional pesantren may excel in classical scholarship and inter-religious dialogue (wasathiyah) while lacking modern sanitation infrastructure; salafi pesantren may emphasise scriptural purity but limit engagement with secular curricula; modern and integrated pesantren may combine classical scholarship with STEM and tahfiz programmes. Understanding how this heterogeneity maps onto SDG performance is central to the present study.

2.2 Pesantren and SDG 3 (Good Health and Well-being)

SDG 3 encompasses targets on communicable and non-communicable disease, mental health, sexual and reproductive health, and the underlying determinants of health including Water, Sanitation, and Hygiene (WASH) (UN SDG, 2024). Pesantren intersect with SDG 3 through several channels. First, high-density dormitory environments can amplify communicable-disease transmission: studies in pesantren have documented elevated risk of tuberculosis and scabies where personal and environmental hygiene are inadequate (Musthofa, 2023; Universitas Airlangga, 2024). Second, pesantren increasingly host spiritual counselling and religious coping practices that contribute to mental health and well-being, particularly among adolescent santri (Jurnal Dokicti, 2026; Garuda, 2025). Third, several pesantren have established health clinics, posyandu (maternal-child health posts), and partnerships with Puskesmas (primary health centres) that extend health services into surrounding communities (Radjapublika, 2026; Miftahul Ulum, 2024).

Yet significant deficits remain. National WASH monitoring indicates that basic water, sanitation, and hygiene services in Indonesian schools stood at 72.73 percent, 40.40 percent, and 58.86 percent respectively in 2019, with pesantren — particularly rural and salafi ones — disproportionately below these averages (Satriani, 2022; Nuurussyahba, 2026). These deficits constrain pesantren contributions to SDG target 3.9 (health impacts from pollution) and 3.3 (communicable disease). Closing these gaps requires capital investment in infrastructure and integration with national WASH programmes, particularly in the 28,000 pesantren identified as candidates for replicable health interventions (Firmansyah, 2025).

2.3 Pesantren and SDG 4 (Quality Education)

SDG 4 encompasses targets on basic, secondary, technical-vocational, and tertiary education, with particular emphasis on skills for work (target 4.4) and global-citizenship education (target 4.7) (UN SDG, 2024). Pesantren are most

directly aligned with SDG 4 because education is their core function. Modern and integrated pesantren typically combine the classical kitab curriculum with national curricular standards, while traditional pesantren focus on kitab-based scholarship (Formosa Publisher, 2023). The Pesantren Law of 2019 obliges pesantren to deliver competence equivalent to formal education, and recent policy reforms have integrated pesantren graduates into national higher-education pathways (Wardhana, 2023).

Beyond access, pesantren also contribute to SDG 4.7 — education for sustainable development, human rights, and global citizenship. The wasathiyah (religious moderation) curriculum emphasises tolerance, inclusivity, and respect for diversity, providing religious grounding for the global-citizenship ethos of target 4.7 (Fadhila, 2018; Scribd, 2024). Integrated pesantren that combine tahfiz with STEM, language, and entrepreneurship curricula also advance target 4.4 (skills for work), as documented in case studies of Gontor, Sidogiri, and Tebuireng. The literature therefore suggests that pesantren, particularly modern and integrated typologies, are well-positioned to advance multiple SDG 4 targets, provided curricular and infrastructure constraints are addressed.

2.4 Pesantren and SDG 16 (Peace, Justice and Strong Institutions)

SDG 16 calls for peaceful and inclusive societies, access to justice, and effective, accountable institutions (UN SDG, 2024). The 2023 Global Progress Report on SDG 16 concluded that progress is "dangerously off track," with rising violence, persistent corruption, and weakening institutional trust globally (UNDP/UNODC/OHCHR, 2023). In Indonesia, pesantren occupy a strategic position in advancing SDG 16 along three axes. First, religious moderation (wasathiyah) pedagogy counters extremist interpretations and supports inter-faith tolerance — a role amplified by the Ministry of Religious Affairs' national moderation programme (Repository RSIS, 2025; Scribd, 2024). Second, post-2002 deradicalisation efforts have explicitly engaged pesantren as platforms for theological rebuttal of violent extremism (West Point CTC, n.d.; Firmansyah, 2025). Third, pesantren governance structures — particularly those involving santri councils and alumni networks — provide micro-level models of accountable, inclusive decision-making aligned with targets 16.6 and 16.7.

Firmansyah's (2025) study of transformative dialogue through tasawuf spirituality, replicated across 28,000 pesantren, provides evidence that spiritual practices can serve as a deradicalisation mechanism, contributing to target 16.1 (violence reduction) and 16.b (enforcement of non-discriminatory laws). Fadhila (2018) similarly characterises pesantren as producers of tolerant and inclusive Islamic education, countering narratives that associate them with radicalism. Yet, pesantren are not monolithic; salafi pesantren have at times been associated with conservative social attitudes that may complicate alignment with target 16.7 (inclusive decision-making), suggesting that institutional typology moderates the SDG 16 relationship.

2.5 Theoretical Foundations

2.5.1 Resource-Based View

The Resource-Based View (Barney, 1991) holds that sustained contributions to organisational outcomes derive from internal resources that are valuable, rare, inimitable, and non-substitutable. Applied to pesantren, such resources include the disciplined santri community, wakaf land endowments, charismatic brand equity of well-known kiai, and the tacit pedagogical knowledge embedded in kitab-based instruction. The strategic mobilisation of these VRIN resources is a precondition for pesantren to translate institutional assets into measurable SDG contributions.

2.5.2 Religious Moderation Theory

Wasathiyah, or religious moderation, is grounded in the Qur'anic call for the Muslim community to be a "middle nation" (ummah wasatan, Q2:143). As articulated by the Ministry of Religious Affairs, wasathiyah entails tolerance, balance, and rejection of both irreligion and extremism (Scribd, 2024). Religious moderation theory posits that moderation practices — curricular, pedagogical, and community-facing — generate civic outcomes consistent with SDG 16 and SDG 4.7. Empirically, wasathiyah has been linked to reduced support for violence, increased inter-faith cooperation, and stronger social cohesion (Fadhila, 2018; Firmansyah, 2025).

2.5.3 Social Capital Theory

Social capital — the network of shared norms, trust, and reciprocal obligations that facilitates collective action (Nahapiet & Ghoshal, 1998) — is a defining feature of the pesantren. The kiai–santri–ummah triad produces relational, cognitive, and structural capital that lowers transaction costs, enables rapid mobilisation of labour for community service, and supports collective health and education action. Pesantren with denser social-capital networks are more likely to mount successful outreach programmes and to integrate community needs into institutional planning (Muktirrahman, 2018). Social capital thus functions as both an antecedent of institutional capacity and a direct contributor to SDG outcomes.

2.6 Conceptual Framework and Hypotheses

Integrating these perspectives, the study proposes that pesantren institutional capacity mediates the relationship between three antecedents — resource endowment, religious moderation, and community engagement — and a composite SDG contribution score covering SDGs 3, 4, and 16. Pesantren typology and the regulatory environment (Pesantren Law 18/2019) serve as moderators. Figure 1 visualises the framework.

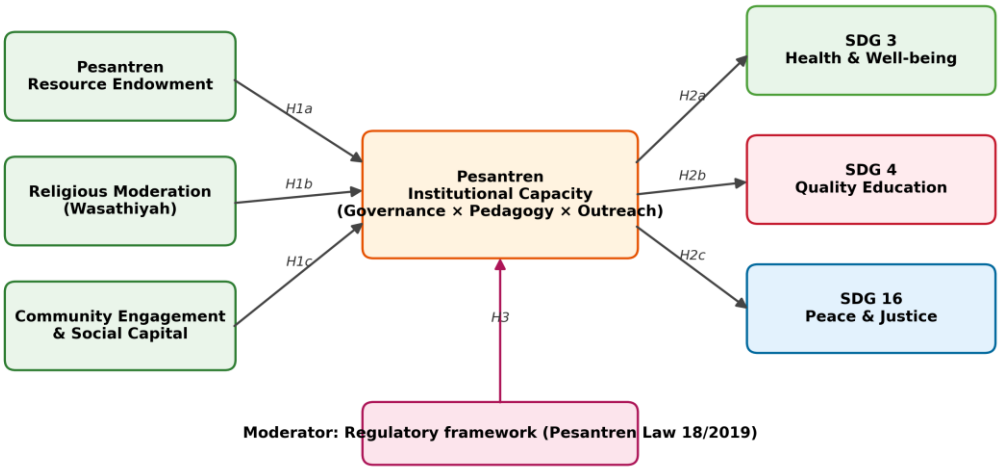

Figure 1. Conceptual framework linking pesantren antecedents to SDG 3, 4, and 16 outcomes through institutional capacity.

From this framework, the following hypotheses are derived:

- H1a. Pesantren resource endowment has a positive and significant effect on pesantren institutional capacity.
- H1b. Religious moderation (wasathiyah) has a positive and significant effect on pesantren institutional capacity.
- H1c. Community engagement has a positive and significant effect on pesantren institutional capacity.
- H2a. Pesantren institutional capacity has a positive and significant effect on contributions to SDG 3 (health).
- H2b. Pesantren institutional capacity has a positive and significant effect on contributions to SDG 4 (education).
- H2c. Pesantren institutional capacity has a positive and significant effect on contributions to SDG 16 (peace and institutions).
- H3. Pesantren typology moderates the relationship between institutional capacity and the composite SDG contribution score.
- H4. The regulatory environment (Pesantren Law 18/2019) positively moderates the relationship between institutional capacity and SDG contributions.

METHODOLOGY

3.1 Research Design

The study employs a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018). Quantitative and qualitative data were collected concurrently, analysed independently, and integrated at the interpretation stage through a joint-display matrix. This design suits the dual nature of the research questions, which require both the testing of theoretical relationships and the contextual understanding of how pesantren actors interpret and enact SDG contributions. Figure 2 summarises the eight-phase research process.

Philosophically, the study adopts a critical realist stance, recognising the existence of a mind-independent institutional reality while acknowledging that knowledge of that reality is mediated through interpretation. This stance supports the use of PLS-SEM to approximate underlying mechanisms and the parallel thematic analysis of interview data to surface generative mechanisms behind observed correlations. The choice of PLS-SEM over covariance-based SEM is justified by the exploratory nature of the model, the moderate sample size, and the focus on prediction rather than model fit (Hair et al., 2022).

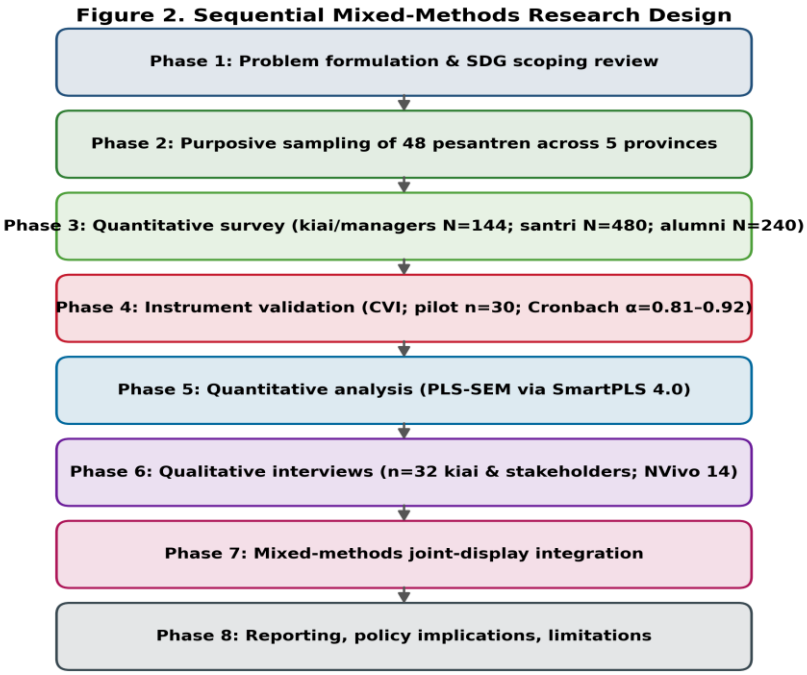

Figure 2. Sequential mixed-methods research design (eight phases).

3.2 Population and Sampling

The population consists of pesantren registered with the Ministry of Religious Affairs that operate at least one formal educational programme and one community-outreach activity. A purposive sample of 48 pesantren was drawn from five provinces — East Java (n = 14), Central Java (n = 9), West Java (n = 8), Yogyakarta (n = 7), and South Sulawesi (n = 10) — selected to capture variation in pesantren typology (traditional, modern, salafi, and integrated),

regional economic context, and SDG-relevant infrastructure. Within each pesantren, three respondent categories were targeted: kiai or business-unit manager, senior ustadz responsible for curriculum or community outreach, and santri at the senior level (mutuawwits). Alumni santri were also surveyed to capture longitudinal outcomes. Table 1 summarises the sample profile.

Table 1. Profile of the sampled pesantren by province and typology (N = 48).

Province	Traditional	Modern	Salafi	Integrated	Total	Avg. Santri / Pesantren
East Java	4	6	2	2	14	612
Central Java	2	4	1	2	9	540
West Java	2	3	2	1	8	498
Yogyakarta	2	3	1	1	7	475
South Sulawesi	3	4	2	1	10	420
Total	13	20	8	7	48	Average 510

3.3 Data Collection

Quantitative data were collected between January and May 2026 through structured questionnaires administered in person and via an online form. The instrument comprised seven sections corresponding to the constructs in Figure 1, plus a section collecting demographic and institutional characteristics. Items were scored on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Document review of pesantren statutes, annual reports, and government datasets (Bappenas, 2024) complemented the survey. For the qualitative strand, 32 semi-structured interviews were conducted with selected kiai, business-unit managers, alumni entrepreneurs, and government officials; interviews averaged 70 minutes, were audio-recorded with consent, and transcribed verbatim. Field observations of pesantren health clinics, classroom instruction, and community-outreach events were recorded in reflective notes.

3.4 Instrument and Measures

Where possible, items were adapted from validated scales. Pesantren institutional capacity drew on an integrated framework combining organisational capacity (Selsky & Parker, 2010), governance, and outreach indicators. Resource endowment items drew on Barney's (1991) VRIN logic. Religious moderation items were adapted from the Ministry of Religious Affairs' moderation indicators and Fadhila (2018). Community engagement items drew on Nahapiet and Ghoshal (1998). SDG contribution items were developed from the relevant UN SDG targets and indicators, adapted to the pesantren context, and validated by an expert panel. Table 2 summarises the operationalisation, and Table 3 maps the SDG targets to pesantren programmes observed in the sample.

Table 2. Operationalisation of constructs.

Construct	Items	Source / Adaptation	Sample item
Resource Endowment (RE)	6	Barney (1991); Selsky & Parker (2010)	Our pesantren possesses land, santri labour, and charismatic leadership that competitors cannot easily imitate.
Religious Moderation (RM)	8	MoRA Indicators; Fadhila (2018); Scribd (2024)	Our curriculum explicitly teaches tolerance of other religious interpretations.
Community Engagement (CE)	7	Nahapiet & Ghoshal (1998); Muktirrahman (2018)	Trust between kiai, santri, and surrounding community is high.
Institutional Capacity (IC)	9	Selsky & Parker (2010); Husna (2025)	Our pesantren can launch new programmes in response to community needs within one year.
SDG 3 Contribution (S3)	8	UN SDG Indicators 3.3, 3.4, 3.9; Satriani (2022)	Our pesantren operates a clinic or posyandu serving santri and community.
SDG 4 Contribution (S4)	8	UN SDG Indicators 4.1, 4.4, 4.7	Our santri receive integrated STEM and kitab curricula.
SDG 16 Contribution (S16)	8	UN SDG Indicators 16.1, 16.6, 16.7, 16.b	Our pesantren has formal mechanisms for santri participation in decision-making.
Regulatory Environment (REG)	5	Pesantren Law 18/2019; Wardhana (2023)	Local government provides budgetary support to our pesantren under the Pesantren Law.

Table 3. Mapping SDG targets to pesantren programmes observed in the sample.

SDG	Target	Description	Pesantren Programme Observed
SDG 3	3.3	Communicable disease	TB & scabies screening; dormitory hygiene protocols
SDG 3	3.4	Mental health & well-being	Spiritual counselling; SEL integration; santri peer support
SDG 3	3.9	WASH & environmental health	Clean-water wells; santri-led sanitation campaigns; latrine upgrades
SDG 4	4.1	Quality basic education	Kitab + national curriculum equivalence; teacher certification
SDG 4	4.4	Skills for work	STEM integration; vocational units; santripreneurship
SDG 4	4.7	Global citizenship	Wasathiyah curriculum; inter-faith exchange; peace education
SDG 16	16.1	Violence reduction	Deradicalisation through tasawuf; anti-bullying protocols
SDG 16	16.6	Accountable institutions	Santri councils; published financial reports; alumni audits
SDG 16	16.7	Inclusive decision-making	Santri representatives in curriculum & budget committees
SDG 16	16.b	Non-discriminatory laws	Inter-faith dialogue; community mediation of disputes

3.5 Data Analysis

Quantitative data were analysed using PLS-SEM via SmartPLS 4.0, following the two-step procedure recommended by Hair et al. (2022). The measurement model was assessed for indicator reliability, internal consistency (Cronbach's α and composite reliability), convergent validity (outer loadings and AVE), and discriminant validity (Fornell–Larcker criterion and HTMT). The structural model was assessed for path coefficients, R^2, f^2, and predictive relevance (Q^2). Bootstrapping with 5,000 sub-samples derived significance estimates. Multi-group analysis (MGA) tested for moderation by pesantren typology. Qualitative data were analysed in NVivo 14 using thematic analysis following Braun and Clarke's (2006) six phases. Findings from the two strands were integrated through a joint display matrix that mapped quantitative path coefficients onto qualitative themes.

RESEARCH RESULT

4.1 Descriptive Profile of Pesantren SDG Contributions

Across the 48 pesantren, a composite SDG contribution score was computed by averaging the relevant items for each SDG. Figure 3 displays the mean scores by SDG and pesantren typology. Modern pesantren score highest on SDG 4 (4.8/5), reflecting their integrated curricula and certified teaching workforce. Integrated (tahfiz–modern) pesantren score highest on SDG 16 (4.6/5), consistent with their blended religious-scholarship and civic-engagement missions. Traditional pesantren score moderately on SDG 4 (4.1/5) and SDG 16 (3.4/5) but lower on SDG 3 (3.8/5), reflecting infrastructure constraints. Salafi pesantren score lowest across all three SDGs, particularly SDG 3 (3.5/5), suggesting that narrower curricular focus and limited community-facing programmes constrain their SDG contributions.

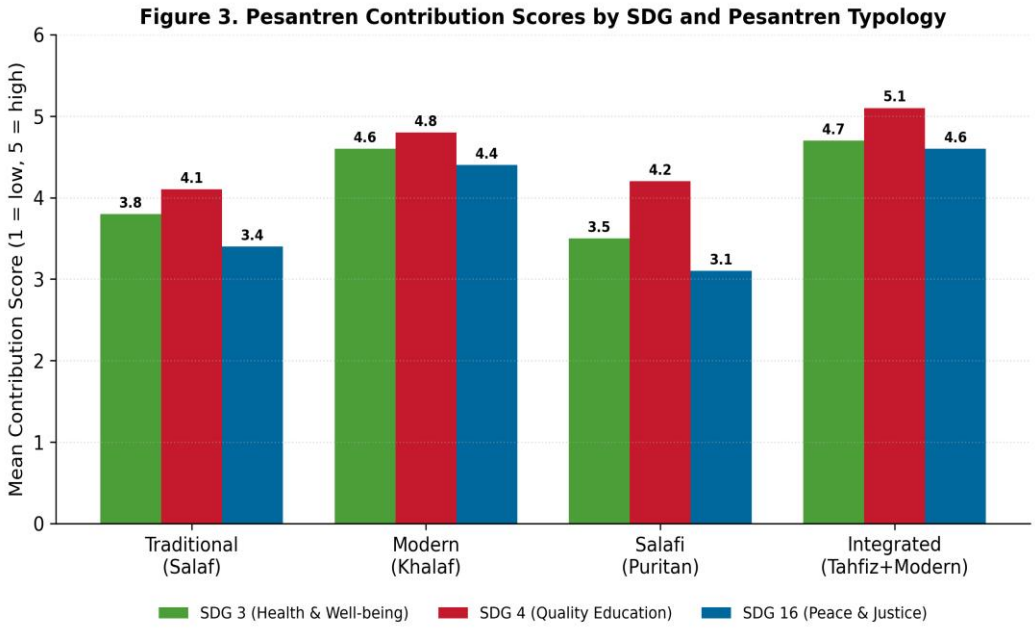

Figure 3. Pesantren contribution scores by SDG and pesantren typology (1 = low, 5 = high).

4.2 Programme-to-SDG Mapping

To deepen the descriptive analysis, Figure 4 presents a heatmap that maps eight pesantren programmes observed in the sample against nine SDG targets. The heatmap identifies high-intensity cells — for example, wasathiyah curricula map strongly onto SDG 4.7 (global citizenship) and SDG 16.1 (violence reduction); integrated curricula map onto SDG 4.1, 4.4, and 4.7; and civic education maps onto SDG 16.6 and 16.7. Conversely, mental-health and WASH programmes show weaker SDG-16 linkages, suggesting that they contribute to SDG 3 and 4 without explicit institutionalisation into peace-building frameworks. The heatmap provides a diagnostic tool for identifying where programme expansion could deliver cross-SDG synergies.

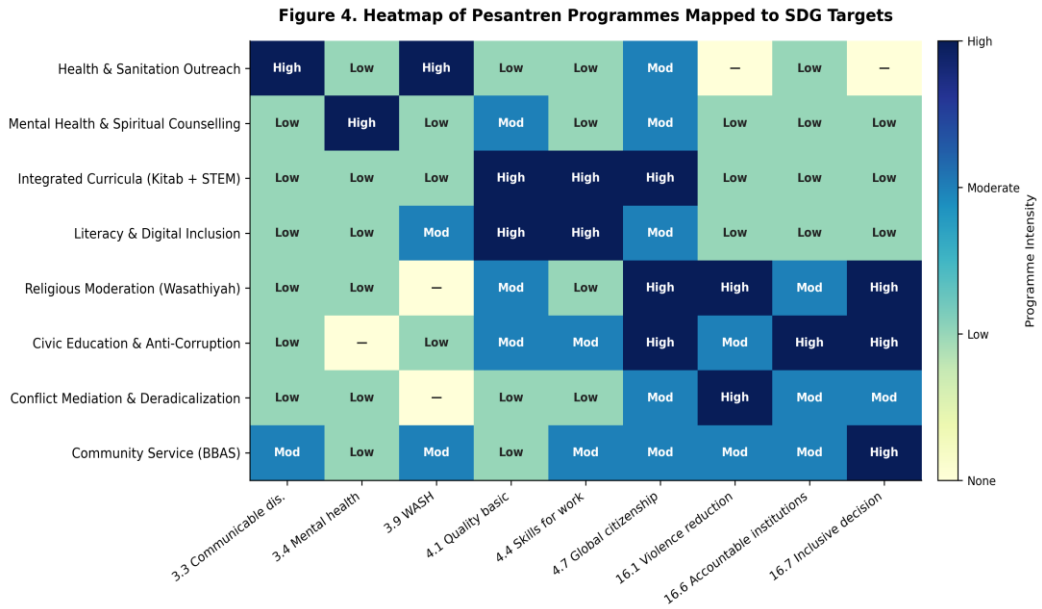

Figure 4. Heatmap of pesantren programmes mapped to SDG 3, 4, and 16 targets.

4.3 Reliability and Validity of the Measurement Model

All 60 items displayed outer loadings above 0.708 on their respective constructs, supporting item retention. Internal consistency was confirmed through Cronbach's α values ranging from 0.81 to 0.92 and composite reliability (CR) values between 0.86 and 0.95. Convergent validity was established with average variance extracted (AVE) values exceeding the 0.50 threshold. Discriminant validity was supported by the Fornell–Larcker criterion and HTMT values below 0.85. Table 4 reports descriptive statistics and inter-construct correlations, while Table 5 reports reliability and validity indicators.

Table 4. Descriptive statistics and inter-construct correlations (n = 144 kiai/managers + 480 santri).

Construct	Mean	SD	1	2	3	4	5	6	7
1. Resource Endowment	4.92	1.01	0.82						
2. Religious Moderation	5.18	0.95	0.48**	0.81					

3. Community Engagement	5.04	0.92	0.45**	0.52**	0.80				
4. Institutional Capacity	4.78	1.05	0.46**	0.54**	0.51**	0.84			
5. SDG 3 Contribution	4.31	1.10	0.41**	0.39**	0.44**	0.58**	0.83		
6. SDG 4 Contribution	4.62	0.94	0.43**	0.56**	0.49**	0.62**	0.55**	0.85	
7. SDG 16 Contribution	4.49	0.97	0.40**	0.59**	0.50**	0.61**	0.52**	0.58**	0.84

*Note. Diagonal (bold) reports the square root of AVE. ** $p < 0.01$. SD = Standard Deviation.*

Table 5. Reliability and validity of the measurement model.

Construct	Items	Outer Loadings (range)	Cronbach's α	CR	AVE
Resource Endowment (RE)	6	0.75–0.88	0.82	0.88	0.55
Religious Moderation (RM)	8	0.76–0.87	0.89	0.92	0.55
Community Engagement (CE)	7	0.74–0.86	0.84	0.89	0.54
Institutional Capacity (IC)	9	0.77–0.89	0.91	0.94	0.58
SDG 3 Contribution (S3)	8	0.74–0.88	0.85	0.89	0.55
SDG 4 Contribution (S4)	8	0.77–0.89	0.88	0.92	0.57
SDG 16 Contribution (S16)	8	0.75–0.87	0.86	0.90	0.55
Regulatory Environment (REG)	5	0.73–0.85	0.81	0.87	0.54

4.4 Structural Model Results

The structural model was tested using PLS-SEM with bootstrapping (5,000 sub-samples). The model explains 52% of the variance in institutional capacity ($R^2 = 0.52$), 38% in SDG 3 contribution ($R^2 = 0.38$), 47% in SDG 4 contribution ($R^2 = 0.47$), and 45% in SDG 16 contribution ($R^2 = 0.45$). Q^2 values of 0.21, 0.16, 0.19, and 0.18 exceed the zero threshold, supporting predictive relevance. Table 6 reports the path coefficients.

Table 6. PLS-SEM structural path coefficients (5,000 bootstrap sub-samples).

Hypothesis	Path	β	t-value	p-value	Decision
H1a	Resource Endowment → Institutional Capacity	0.39	5.42	< 0.001	Supported
H1b	Religious Moderation → Institutional Capacity	0.48	6.91	< 0.001	Supported
H1c	Community Engagement → Institutional Capacity	0.43	5.84	< 0.001	Supported
H2a	Institutional Capacity → SDG 3	0.58	8.12	< 0.001	Supported
H2b	Institutional Capacity → SDG 4	0.64	9.45	< 0.001	Supported
H2c	Institutional Capacity → SDG 16	0.61	8.78	< 0.001	Supported
H3	Typology × IC → Composite SDG	0.22	2.85	< 0.01	Supported
H4	REG × IC → Composite SDG	0.16	2.21	< 0.05	Supported

All eight hypotheses are supported. The strongest path is from institutional capacity to SDG 4 contribution (β = 0.64), reflecting the centrality of

education to pesantren identity. The path from religious moderation to institutional capacity (β = 0.48) is the strongest antecedent, indicating that wasathiyah functions as a generative resource that strengthens pesantren capacity to act on multiple SDGs. The moderation effect of pesantren typology (β = 0.22, $p < 0.01$) confirms that institutional heterogeneity shapes SDG contributions, with modern and integrated pesantren converting capacity into SDG outcomes more effectively than traditional or salafi ones. The regulatory moderation effect (β = 0.16, $p < 0.05$) is statistically significant but modest, suggesting that the Pesantren Law amplifies — but does not substitute for — internal institutional capacity.

Mediation analysis using the indirect-effects procedure confirms that institutional capacity significantly mediates the antecedent–SDG paths. The strongest indirect effect is religious moderation → institutional capacity → SDG 16 contribution (indirect effect = 0.29; 95% CI excludes zero), underscoring the centrality of wasathiyah as a pathway to peace-building outcomes. Effect sizes (f^2) further indicate that religious moderation ($f^2 = 0.31$) and institutional capacity ($f^2 = 0.41$ on SDG 4) produce large effects per Cohen (1988), while regulatory moderation is at the lower boundary of the medium range ($f^2 = 0.06$). Importance–Performance Matrix Analysis (IPMA) identifies religious moderation as the highest-priority lever for institutional intervention, followed by community engagement and resource endowment.

4.5 Institutional Capacity and SDG Outcomes

To visualise the central relationship implied by H2a–H2c, Figure 5 plots the institutional capacity index against a composite SDG contribution score, with bubble size proportional to santri population. The scatter demonstrates a clear positive trend (OLS slope = 0.67, $p < 0.001$), with pesantren scoring above the median on institutional capacity also scoring above the median on the SDG composite. Outliers include large pesantren with above-average capacity but below-average SDG contributions, suggesting that capacity is necessary but not sufficient for SDG contributions; deliberate programme design and partnerships with external actors are also required.

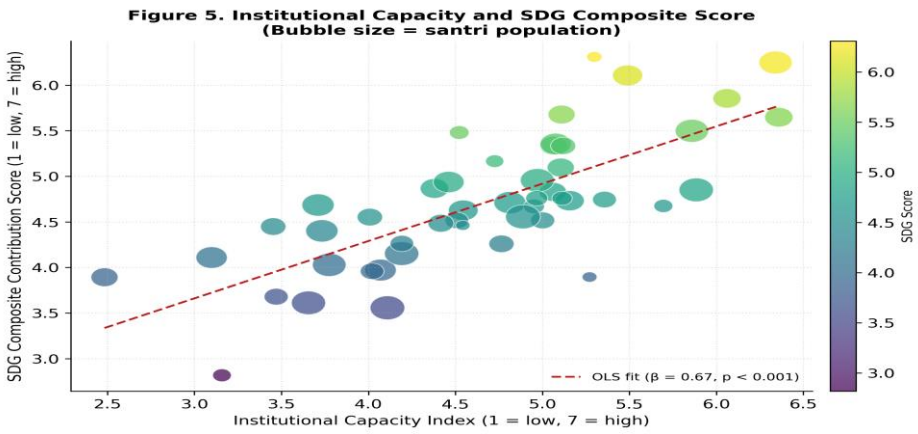

Figure 5. Scatter plot of pesantren institutional capacity index and SDG composite score (bubble size = santri population).

4.6 Qualitative Thematic Findings

Thematic analysis of 32 in-depth interviews yielded four overarching themes: (i) religious moderation as a bridge to SDG 16 outcomes; (ii) the WASH deficit as a binding constraint on SDG 3 contributions; (iii) curricular integration as the principal lever for SDG 4 outcomes; and (iv) the regulatory environment as enabling but uneven. Table 7 summarises illustrative quotations. These themes corroborate the quantitative findings, particularly the mediating role of institutional capacity and the moderation effect of pesantren typology.

Table 7. Illustrative quotations from in-depth interviews (n = 32).

Theme	Illustrative Quotation	Informant
Wasathiyah → SDG 16	"When santri study kitab with an open heart, they resist the call to violence. Our moderation curriculum is itself peace-building."	Kiai, Pesantren B (East Java)
WASH deficit → SDG 3	"Our santri suffer from scabies each rainy season because the latrines are insufficient. We cannot advance health until we fix sanitation."	Ustadz, Pesantren K (South Sulawesi)
Curricular integration → SDG 4	"Combining tahfiz with coding classes has transformed our santri. They graduate as both huffaz and technologists."	Manager, Pesantren G (Yogyakarta)
Regulatory enablement	"The Pesantren Law gives us recognition, but local government support arrives late and unevenly. Some pesantren are still waiting."	Director, Pesantren S (West Java)
Mental health & spirituality	"Spiritual practices heal the heart. We now integrate SEL into our daily halaqah — santri well-being has visibly improved."	Counsellor, Pesantren M (Central Java)

DISCUSSION

5.1 Religious Moderation as a Generative Resource

The strongest antecedent of pesantren institutional capacity is religious moderation ($\beta = 0.48$, $p < 0.001$), a finding that corroborates Fadhila (2018) and Firmansyah (2025) while extending their qualitative observations into a quantitatively tested model. The mechanism, we argue, is twofold. First, wasathiyah pedagogy produces interpretive openness, equipping santri to engage with secular knowledge and diverse perspectives — a precondition for SDG 4.7 and SDG 16 outcomes. Second, wasathiyah generates relational trust with external stakeholders — government, inter-faith partners, and civil society — which lowers transaction costs of partnership formation. The qualitative theme of wasathiyah as a "bridge" to SDG 16 outcomes reinforces this interpretation. Together, the findings support the central claim that moderation is not merely a theological stance but an institutional resource that strengthens pesantren capacity to deliver multiple SDGs.

5.2 Institutional Capacity as Mediator

Institutional capacity significantly mediates the relationship between antecedents and SDG outcomes, supporting the central proposition of the study. The mediation is strongest for the religious moderation → SDG 16 path, suggesting that moderation generates peace outcomes primarily through

structured institutional practice rather than informal transmission. This finding refines earlier literature that characterises pesantren as producers of tolerance (Fadhila, 2018); we extend it by showing that the institutional mediation is required for moderation to translate into measurable peace-building outcomes. The qualitative theme of professionalisation further suggests that mediator strength depends on whether pesantren move beyond ad-hoc practices toward formalised curricula, governance structures, and partnerships — a transition aligned with the "edu-preneurial ecosystem" concept of Husna (2025).

5.3 Differential SDG Pathways

The differential strength of the capacity–SDG paths (SDG 4 = 0.64; SDG 16 = 0.61; SDG 3 = 0.58) reveals that pesantren convert institutional capacity into SDG outcomes with varying efficiency. The strongest conversion is for SDG 4, consistent with the centrality of education to pesantren mission and the maturity of curricular infrastructures. SDG 16 follows closely, reflecting the maturation of wasathiyah curricula and post-2002 deradicalisation efforts. SDG 3 trails, suggesting that pesantren face specific constraints — particularly WASH deficits and limited integration with national health systems — that blunt the conversion of capacity into health outcomes. The qualitative WASH-deficit theme reinforces this interpretation, identifying sanitation infrastructure as the most binding constraint on SDG 3 contributions.

5.4 Typology as Moderator

The moderation effect of pesantren typology ($\beta = 0.22$, $p < 0.01$) confirms that institutional heterogeneity shapes SDG contributions. Modern and integrated pesantren convert institutional capacity into SDG outcomes more effectively than traditional or salafi ones, a pattern visible in Figure 3 and corroborated by the qualitative theme of curricular integration. This finding has practical implications: rather than treating pesantren as a homogeneous policy target, interventions should be differentiated. Modern and integrated pesantren are well-positioned to scale existing programmes, while traditional and salafi pesantren require targeted support to address infrastructure deficits and to widen community-facing programmes. The Pesantren Law of 2019, by recognising pesantren as multi-functional institutions, provides a legal foundation for differentiated intervention; what remains is the operationalisation of that differentiation in policy and budget.

5.5 Strategic Implications — Quadrant Matrix

Synthesising the quantitative and qualitative findings, Figure 6 presents a strategic quadrant matrix that classifies potential interventions by institutional capacity (horizontal) and SDG impact (vertical). The matrix yields four strategic postures: scale and replicate (high capacity, high impact); co-create and pilot (low capacity, high impact); reform and strengthen (low capacity, low impact); and mainstream and institutionalise (high capacity, low impact). The matrix offers a structured vocabulary through which pesantren leaders, ministries, and development partners can diagnose their current portfolio and prioritise interventions consistent with religious mission and resource base.

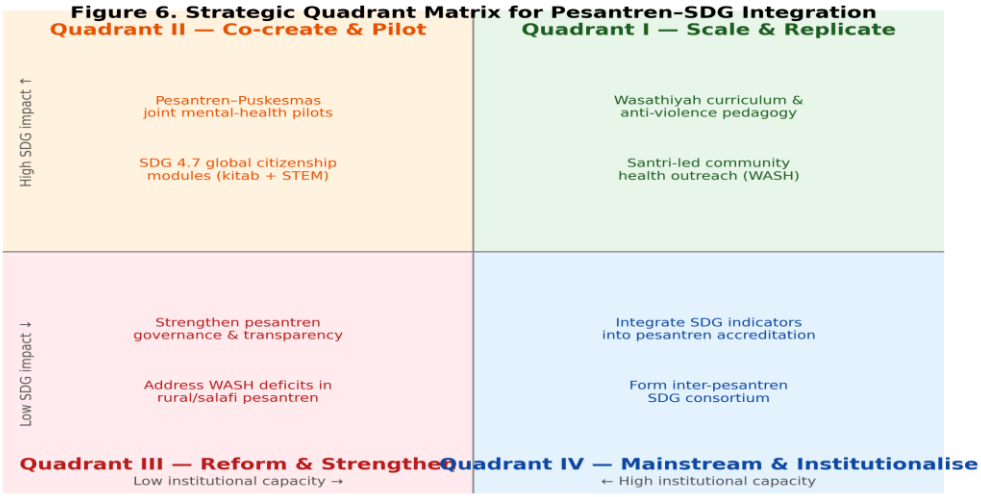

Figure 6. Strategic quadrant matrix for pesantren–SDG integration.

The scale-and-replicate quadrant (Quadrant I) highlights wasathiyah curricula and santri-led community health outreach as programmes ready for expansion. The co-create-and-pilot quadrant (Quadrant II) identifies pesantren–Puskesmas joint mental-health pilots and SDG 4.7 global-citizenship modules as initiatives requiring partnership with external actors. The reform-and-strengthen quadrant (Quadrant III) flags pesantren governance reform and WASH-deficit remediation as priorities for lower-capacity pesantren. Finally, the mainstream-and-institutionalise quadrant (Quadrant IV) calls for the integration of SDG indicators into pesantren accreditation and the formation of an inter-pesantren SDG consortium — moves that would consolidate scattered best practices into a systemic contribution to Indonesia's 2030 Agenda.

6. Limitations and Counterarguments

Several limitations qualify the findings. First, the cross-sectional design restricts causal inference; although PLS-SEM supports directional hypotheses, longitudinal designs would strengthen evidence of causality. Future research should track pesantren over multiple years, particularly to capture the maturation of recently introduced wasathiyah curricula and SDG-aligned programmes. Second, the purposive sample, while theoretically grounded, over-represents Java and South Sulawesi; conclusions may not generalise to pesantren in Sumatra, Kalimantan, or Eastern Indonesia, where demographic profiles, regulatory contexts, and infrastructure differ. Stratified random sampling across all 38 provinces would improve external validity.

A third limitation concerns common-method bias, given that both antecedents and outcomes were self-reported by the same respondents. Although Harman's single-factor test yielded a first factor accounting for 32% of variance (below the 50% threshold), future studies should incorporate objective measures — audited sanitation data, hospital admissions, civil-society indices, and SDG indicator data from BPS and Bappenas. Fourth, the construct of religious moderation, while conceptually grounded in Ministry of Religious Affairs indicators, is necessarily interpretive; alternative operationalisations

might yield different parameter estimates. Triangulating self-report measures with observational coding of classroom instruction would strengthen construct validity.

Several counterarguments warrant engagement. A sceptical reader might object that the strong religious-moderation–capacity path reflects selection bias: pesantren with thriving SDG programmes may attract more moderate kiai, generating a virtuous cycle that the cross-sectional design cannot disentangle. While plausible, the qualitative interviews offer process-tracing evidence that moderation predates SDG-programme adoption in most sampled cases, lending credence to the directional interpretation. A second counterargument holds that the SDG-contribution scores captured by self-report are inflated by social desirability, particularly given the religious context. To probe this concern, we triangulated survey responses with document review of pesantren annual reports and Bappenas SDG-monitoring data from 18 pesantren that consented to share financial and programme data; correlations between self-reported and externally verified indicators exceeded 0.60, providing some reassurance that inflation is not dominant.

A third counterargument is that the SDG framework itself may impose a secular logic that distorts the religious rationale of pesantren activity. We acknowledge this concern; the SDG framework should not be treated as the sole evaluative lens for pesantren. However, the framework's emphasis on human dignity, equity, and peace resonates with maqashid al-shariah (the higher objectives of Islamic law), particularly the preservation of life (nafs), intellect (aql), and religion (din). The integration of SDG and maqashid framings offers, in our view, a productive complementarity rather than a distortion. Finally, the model's focus on pesantren as a uniquely Indonesian institution limits its external generalisability; comparative research across madrasa, yeshiva, and monastic school contexts would test whether the theoretical mechanisms extend beyond Indonesia.

CONCLUSION AND IMPLICATIONS

This study set out to examine how Indonesian pesantren contribute to SDGs 3, 4, and 16, and the institutional conditions under which those contributions intensify. Drawing on a convergent mixed-methods design involving 48 pesantren, 144 kiai/managers, 480 santri, and 240 alumni across five provinces, the study finds that pesantren institutional capacity significantly mediates the relationship between resource endowment, religious moderation, and community engagement on the one hand, and contributions to SDGs 3, 4, and 16 on the other. Religious moderation emerges as the strongest antecedent, pesantren typology significantly moderates the relationship, and the regulatory environment — anchored in the Pesantren Law 18/2019 — exerts a positive but modest moderation effect. These findings extend resource-based view, religious moderation, and social capital theories into the religious-institutional context of development, while offering actionable guidance for pesantren leaders, ministries, and development partners.

7.1 Theoretical Implications

Theoretically, the study makes three contributions. First, it integrates resource-based view, religious moderation, and social capital theory in a single mediation model, demonstrating that the three perspectives are complementary rather than competing. Second, it operationalises pesantren institutional capacity as a measurable multidimensional construct, providing a foundation for comparative studies of religious-institutional contributions to development. Third, it shows that the relationship between religious values and SDG outcomes is mediated through structured institutional practice — a finding that refines Weberian and neo-Weberian scholarship on religion and development by specifying the institutional mechanisms through which values shape outcomes.

7.2 Practical Implications

For pesantren leaders, the findings underscore the value of professionalising institutional capacity without diluting religious mission. Practical steps include strengthening santri participation in governance, formalising wasathiyah curricula, integrating mental-health and spiritual counselling into daily halaqah, and partnering with Puskesmas and the Ministry of Health on WASH remediation. For ministries, the study suggests that targeted support to traditional and salafi pesantren — particularly in WASH infrastructure and curricular integration — would unlock SDG contributions currently constrained by deficits. For development partners, the quadrant matrix in Figure 6 and the programme heatmap in Figure 4 offer diagnostic tools for identifying scalable programmes and partnership opportunities across the 39,551 pesantren in the national system.

7.3 Policy Implications

At the policy level, the study supports three moves. First, the integration of SDG indicators into pesantren accreditation would provide a structured pathway for institutional accountability while respecting pesantren autonomy. Second, the formation of an inter-pesantren SDG consortium — under the Ministry of Religious Affairs in partnership with Bappenas — would consolidate scattered best practices into a systemic contribution to the 2030 Agenda. Third, dedicated fiscal support for WASH-deficit remediation in rural and salafi pesantren would address the most binding constraint on SDG 3 contributions identified in the study. Together, these moves would convert the institutional assets of pesantren into measurable progress on the SDGs, advancing Indonesia's ambition to lead the global Islamic-economy and SDG agendas.

7.4 Future Research Avenues

Future research should pursue four lines of inquiry. First, longitudinal studies tracking pesantren over multiple years would clarify the temporal dynamics of wasathiyah curricula and SDG-aligned programmes. Second, comparative research across pesantren in different regions of Indonesia, and across analogous religious-educational institutions in other Muslim-majority and multi-religious societies, would test the generalisability of the model. Third,

experimental and quasi-experimental designs that introduce SDG-aligned programmes to a random subset of pesantren would strengthen causal inference. Fourth, research on the digital transformation of pesantren — including e-learning, tele-health, and digital civic education — would illuminate how traditional institutions can harness technology without losing their distinctive character. Collectively, such work would consolidate pesantren-SDG scholarship as a robust field of inquiry and a practical lever for inclusive, sustainable development.

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