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The Governance of Digital Yield in Indonesian Sugar Partnerships: Integrating Procedural Justice with Contemporary Islamic Economic Law

Abstract: This study investigates the governance of digital yield systems in Indonesian sugarcane partnership schemes by integrating procedural justice theory with contemporary Islamic economic law. It analyses the structural limitations of conventional yield-determination practices, evaluates the transformative role of digital technologies in enhancing fairness and accountability, and formulates a normative governance framework grounded in procedural justice and Islamic legal principles. Adopting a qualitative socio-legal approach, the research combines doctrinal analysis of regulatory frameworks with empirical data derived from in-depth interviews, field observations, and stakeholder engagement in major sugarcane-producing regions. Findings reveal that information asymmetry, limited farmer participation, opaque measurement procedures, and weak supervisory oversight are frequently characteristic of conventional yield-determination mechanisms. These deficiencies foster distrust and distributive imbalances within partnership arrangements. The introduction of digital yield systems—marked by data-driven measurement, traceable production records, and real-time monitoring—substantially improves procedural transparency and institutional accountability. Digitalisation curtails opportunistic behaviour, strengthens farmers' access to information, and promotes more balanced decision-making. From the perspective of contemporary Islamic economic law, such governance mechanisms resonate with the principles of *'adl* (justice), *amanah* (trustworthiness), and *shafāfiyyah* (transparency), while advancing the *maqāṣid*-oriented protection of property (*ḥifẓ al-māl*). The study contributes to theory by bridging procedural justice and Islamic economic jurisprudence in the context of digital agricultural transformation. Practically, it offers a policy-relevant model for equitable, technology-driven partnership governance that aligns innovation with ethical and normative legal values in agrarian economies.

Keywords: Digital Governance; Procedural Justice; Sugarcane Partnerships; Yield Determination.

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INTRODUCTION

The national sugar sector still faces complex structural problems, ranging from low land productivity and import dependence to weak partnership governance between farmers and sugar mills.[1] In various production centres such as Lampung, East Java, and Central Java, the pattern of sugarcane partnerships is the backbone of production relations between plasma farmers and processing companies. In this scheme, yield determination is crucial because it directly determines the amount of profit-sharing received by farmers. However, conventional practices for determining yields are often characterised by information asymmetry, limited farmers' access to measurement data, closed laboratory procedures, and a lack of independent monitoring mechanisms. This condition not only causes mistrust but also has the potential to create an inequality in the distribution of profits in partnership relationships.[2]

Conceptually, the problem can be read through the perspective of procedural justice. This theory emphasises that the legitimacy of a decision is not determined solely by the distributive outcome but also by the quality of the process, including participation, neutrality, consistency, and transparency. In the context of sugarcane partnerships, farmers are often not meaningfully involved in the determination process, so even if the final result appears formalistic and legitimate, the perception of fairness remains questionable. The lack of transparency in the process of measuring and reporting data weakens institutional accountability and enlarges the space for opportunistic behaviour.[3]

On the other hand, digital transformation in the agricultural sector opens up opportunities for governance reform. The implementation of digital performance systems—through data-driven sensors, integrated production recording, and real-time monitoring—promises better transparency and traceability. Digitalisation has the potential to reduce data manipulation, improve farmers' access to information, and create a more objective control mechanism. However, digitalisation is not an automatically neutral solution. Without a

[1] Thinzar Win, Tri Haryanto, and Dyah Wulan Sari, 'Analysis of Energy Efficiency of Indonesia's Sugar Industry', *International Energy Journal* 21, no. 2 (June 2021): 245–256.

[2] 'Policy Reform to Lower Sugar Prices in Indonesia', CIPS | Think Tank, accessed 27 February 2026, https://www.cips-indonesia.org/publications/policy-reform-to-lower-sugar-prices-in-indonesia.

[3] Muhammad Irfani Abdullah, Irene Kartika Eka Wijayanti, and Djeimy Kusnaman, 'The Competitiveness of Indonesian Sugar Export in The South East Asia Region', *JURNAL AGRIBISAINS* 9, no. 2 (October 2023): 113–123, https://doi.org/10.30997/jagi.v9i2.7201.

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governance design oriented towards procedural justice, technology can instead reproduce old inequalities in new forms, for example, through companies' monopolies over system access or farmers' weak digital literacy.[4]

In the discourse of contemporary Islamic economic law, the issue of partnership governance is not viewed solely from a formal contractual perspective but also from ethical and *maqāṣid al-syarī'ah* perspectives. The principles of justice (*'adl*), *amanah* (trust), and *shafāfiyyah* (transparency) are the normative foundations in *mu'āmalah* relations. The protection of property (*ḥifẓ al-māl*) as one of the main objectives of *maqāṣid* requires a mechanism that prevents exploitation or *gharar* (ambiguity) in transactions. In the context of sugarcane partnerships, the practice of non-transparent rendition determination can be categorised as a lack of clarity in information that is contrary to these principles. Therefore, integrating procedural justice theory with contemporary Islamic economic law is relevant for formulating governance models that are not only technically efficient but also normatively valid.

Several previous studies have examined sugarcane partnerships from various perspectives. First, studies on the national sugar trading system generally emphasise production efficiency and industrial competitiveness, focusing on import policy reform, sugar factory revitalisation, and increased land productivity. While important, this approach tends to treat farmers as purely economic variables, failing to examine the procedural justice dimensions of partnership relationships.[5] Second, research on agricultural digitalisation in Indonesia has largely discussed the use of technology to increase crop yields and distribution efficiency, but has not specifically linked digitalisation to the transformation of partnership governance and profit-sharing mechanisms.[6] Third, the study of Islamic economic law related to agrarian partnerships generally focuses on muzāra'ah or musāqah contracts from the perspective of classical and contemporary fiqh,

[4] 'View of Digitalisasi UMKM Gula Merah Melalui Pemanfaatan Google Maps di Desa Pematang Serai, Kabupaten Langkat', accessed 27 February 2026, https://jurnal.kdi.or.id/index.php/nr/article/view/3424/1743.

[5] Win, Haryanto, and Sari, 'Analysis of Energy Efficiency of Indonesia's Sugar Industry'.

[6] Mahidin Fahmie and Solehan, 'Transforming Agriculture in The Digital Age: A Literature Review on Innovation, Value Chain Integration, and Farmer Empowerment', *INTERNATIONAL JOURNAL OF ECONOMIC LITERATURE* 3, no. 8 (February 2026): 349–59.

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without integrating the development of digital technology as a variable of modern governance.[7]

Thus, there are three significant research gaps. First, there is no analytical integration between the theory of procedural justice and the practice of determining yields in sugarcane partnerships. Second, there is a lack of exploration of how the digital rendition system can change the structure of power relations and information distribution in agrarian partnerships. Third, there has been no normative framework that explicitly links digital governance to the principles of contemporary Islamic economic law, especially in protecting farmers' rights.

This research offers novelty in three main aspects. Theoretically, this research bridges two conceptual frameworks that have been developing separately, namely procedural justice and contemporary Islamic economic law, to build a value-based partnership governance model. Methodologically, this study uses a socio-legal approach that combines doctrinal analysis of partnership regulations with empirical data from in-depth interviews, field observations, and stakeholder involvement in sugarcane production centres. This approach allows for a more comprehensive mapping of the gap between norms and practices. Practically, this study formulates a digital performance governance framework that is not only oriented towards technical efficiency but also towards strengthening participation, transparency, and institutional accountability. Based on this background, the research question is: How can the digital rendition system in sugarcane partnerships in Indonesia be designed and implemented as a model of procedurally fair governance that aligns with the principles of contemporary Islamic economic law?

The significance of this research lies in its contribution to the development of theory and policy. Academically, this research enriches the literature on digital transformation in the agrarian sector by incorporating procedural justice and *maqāṣid al-syarī'ah* as an evaluative framework. This integration broadens the scope of Islamic economic law studies from abstract normative debates to concrete, technology-based governance issues. In terms of policy, the findings of this study can be a reference for

[7] Muhamad Farhan and Wargo Wargo, 'Islamic Economic View of the Practice on Partnership Cooperation Agreements', *Zabags International Journal of Economy* 2, no. 1 (February 2024): 1–8, https://doi.org/10.61233/zijec.v2i1.72.

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regulatory designers and industry players in formulating operational standards for a transparent, participatory, and accountable digital rendition system. For farmers, the proposed governance model is expected to strengthen bargaining positions and rebuild trust in partnership relationships. In the end, this study emphasizes that technological innovations in the agricultural sector should not be separated from ethical and legal foundations, but should be directed towards realizing substantive justice and the sustainability of Indonesia's agrarian economy.

METHOD

This study uses a qualitative approach with a socio-legal design, combining normative analysis of the cane partnership regulatory framework with an empirical study of field yield-determination practices. This approach was chosen to capture the gap between legal norms, institutional design, and operational realities of the rendition system, particularly in the context of digitalisation. Primary data were obtained through in-depth interviews with sugarcane farmers, sugar mill managers, technical officials, and relevant stakeholders in key production centres. In addition, field observations were carried out on the process of measuring performance and implementing digital systems, as well as document reviews of partnership contracts, regulations, and operational guidelines. Secondary data were collected through a literature review on procedural justice, digital governance, and contemporary Islamic economic law.

Data analysis is carried out qualitatively through the stages of data reduction, thematic categorisation, and inductive-constructive conclusion drawing.[8] The researcher identified patterns of procedural injustice, forms of information asymmetry, and governance changes that emerged after the implementation of digital systems, then interpreted them within the framework of procedural justice theory and Islamic economic legal principles such as *'adl*, *amanah*, and property protection (*hifz al-mᾱl*). To maintain the validity and credibility of the findings, this study applies a triangulation technique of sources and methods, namely, comparing the results of interviews, observations, and official documents. In addition, member checking was conducted with several key

[8] Helaluddin and Hengki Wijaya, *Analisis Data Kualitatif: Sebuah Tinjauan Teori & Praktik* (Sekolah Tinggi Theologia Jaffray, 2019).

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informants to ensure the accuracy of interpretation, and trail audits were conducted through systematic recording of the research process to ensure transparency and consistency in analysis.

RESULTS AND DISCUSSION

Structural Limitations of Conventional Yield Determination in Sugarcane Partnerships

Field findings show that the main problem in sugarcane partnerships is not solely low productivity but rather weak governance in yield determination. Yield is the most sensitive variable because it directly determines farmers' income. In conventional practice, measurements are carried out in a factory laboratory, using relatively complex technical procedures that farmers do not fully understand. Although there are formal operational standards, at the implementation level, there are several structural limitations. First, there is a significant asymmetry of information. Farmers generally receive only the final results in the form of yield figures, without access to details of the testing process, such as sampling methods, calibration standards, or correction variables. This technical information is under the manufacturer's complete control.[9] In a situation like this, farmers' bargaining position is weakened because they lack a comparative database to verify their claims. Second, farmers' participation in the supervision process is relatively limited.[10] Although some regions provide farmer representatives to witness the testing process, the involvement is symbolic. Representations are not always accompanied by adequate technical capacity to understand or criticise laboratory procedures.[11] As a result, participation has not served as a substantive control mechanism. Third, the mechanism for handling complaints and correcting results is ineffective. The procedure of objecting to yield often requires

[9] Z. Shan, 'How Digitalisation/Automation Addresses Sugar Production Challenges', *International Sugar Journal* 120 (June 2018).

[10] Kenneth M. Lori et al., 'Technological Advancement and the Decline of Religiosity: A Sociological Analysis of the History of Religions and Their Future in the Twenty-First Century', *Al-Biruni Journal of Humanities and Social Sciences*, 21 April 2026, 44, https://doi.org/10.64440/BIRUNI/BIR0023.

[11] Tria Wardani, Nurbaiti Nurbaiti, and Muhammad Ikhsan Harahap, 'Development of Digital Marketing Technology to Increase Sales in the MSMEs of the Neera Palm Sugar Palm Oil Business in Perbaungan District Melati II Village', *Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE)* 6, no. 3 (August 2023): 1687–1702, https://doi.org/10.31538/iijse.v6i3.3803.

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additional time and cost, so many farmers choose to accept the announced yield.[12] This situation creates relational inequality, which impacts declining trust in partnerships.

If analyzed through the lens of procedural justice, these weaknesses indicate that the principles of voice (opportunity to express opinions), neutrality (impartiality), transparency (information disclosure), and accountability have not been fully met.[13] The interviews showed that perceptions of injustice were more strongly triggered by the closure of the process than by the nominal result itself. This means that the procedural dimension has a central role in building legitimacy. The following table summarises the main findings regarding the limitations of conventional systems:

Table 1. Comparison of Aspects of Conventional Governance and Its Implications for Procedural Justice in Farmer Partnerships

Governance Aspects	Conventional Conditions	Impact on Farmers	Implications of Procedural Justice
Access Information	Closed laboratory data	Verification inability	Low transparency
Participation	Representative, non-substantive	Minimal control	Limited voice
Objection Mechanism	Procedural, bureaucratic	Refusing to protest	Weak accountability
Supervision	Company Internal	Potential conflicts of interest	Neutrality questionable

Source: Author's Interpretation

The table above shows that the conventional governance structure in the partnership pattern remains dominated by a closed, internal, corporate-oriented approach, with direct implications for farmers' procedural fairness. In terms of access to information, the closure of laboratory data deprives farmers of adequate verification capabilities, leading to low transparency and weakened bargaining positions. In terms of participation, farmer involvement is representative but not substantive, resulting in limited control and a lack of voice in decision-making. The objection mechanism tends to be procedural and bureaucratic, discouraging farmers from protesting, thereby weakening the system's

[12] Rela Adi Himarosa et al., 'Strengthening Palm Sugar Product Competitiveness through Digital Marketing', *Community Empowerment* 8, no. 12 (December 2023): 2027–33, https://doi.org/10.31603/ce.10160.

[13] Dia Setiawati and Dyah Widowati, 'Administration of Sugar Factory Equipment Repair Services', *IJESS International Journal of Education and Social Science* 6, no. 1 (April 2025): 10–16, https://doi.org/10.56371/ijess.v5i2.352.

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accountability. Meanwhile, internal oversight by companies can create conflicts of interest and undermine the process's neutrality. Overall, this governance configuration reveals structural inequities that hinder the realisation of the principles of transparency, meaningful participation, accountability, and neutrality, the main pillars of procedural justice.

Digital Yield Systems as an Instrument of Procedural Transformation

The implementation of digital rendering systems across several research sites led to a fundamental shift in data management practices and decision-making processes. If previously the measurement and recording process was carried out manually with a relatively wide degree of discretion, the digital system provides a more structured, documented operational standard. In general, the system includes application-based recording, real-time integration of production data, automated sensors to measure sugar levels, and online access to test results.[14] This transformation is not only technical but also procedural, as it affects power relations, control patterns, and information distribution in partnerships.[15]

The first transformation that stands out is the increase in data traceability. Each sugarcane shipment is digitally recorded with the farmer's identity, time, location, and relevant technical parameters. The data is stored in the system and can be traced back when there are discrepancies in calculations or objections. With a systematic digital footprint, the potential for administrative manipulation can be suppressed, and the informal negotiation space that was previously prone to irregularities becomes increasingly limited. The process that once relied on personal trust is now shifting to a record-based system.[16]

The second transformation concerns the openness of access to information. In some locations, farmers can monitor test results through an app or electronic notification.

[14] Said Zul Amraini et al., 'Manufacturing of Crystal Palm Sugar and Digital Product Marketing in Lubuk Bendahara Timur Village', *ABDIKAN: Jurnal Pengabdian Masyarakat Bidang Sains Dan Teknologi* 1, no. 3 (August 2022): 358–362, https://doi.org/10.55123/abdikan.v1i3.810.

[15] Muhammad Azam et al., 'AI-Driven Sharia Governance in Islamic Digital Payment Systems: Developing a Contemporary Islamic Law Framework for Ethical and Regulatory Compliance', *Nusantara: Journal of Law Studies* 5, no. 2 (July 2026): 849–880, https://doi.org/10.66325/nusantaralaw.v5i2.339.

[16] Yuliana Yuliana and Candraningrat Candraningrat, 'Penerapan Strategi Pemasaran Digital Marketing Dalam Meningkatkan Penjualan (Studi Deskriptif Pada Pelaku UMKM Pengrajin Gula Aren Di Desa Halong Kecamatan Haruai)', *JURNAL RUMPUN MANAJEMEN DAN EKONOMI* 2, no. 4 (June 2025): 77–85, https://doi.org/10.61722/jrme.v2i4.5294.

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Information that was previously exclusive and concentrated on the company's side is now more distributed. This direct access not only increases transparency but also reinforces a sense of participation and ownership of the process. When farmers understand how yield values are determined, trust in yields tends to increase, and potential conflicts can be minimised. The third transformation addresses accountability. Systematic data storage simplifies the audit process, both internally and externally. In the event of a dispute, the correction process can be carried out by referring to a relatively objective digital track record. Thus, dispute resolution is no longer based solely on unilateral claims, but rather on documented evidence.

Nonetheless, the effectiveness of a digital rendition system is largely determined by the governance design that accompanies it. In some research locations, digital literacy constraints, limited infrastructure, and device access are still real challenges. Without adequate mentoring and training, digitalisation has the potential to create new dependencies on system operators and widen the capacity gap between farmers. Therefore, digital transformation will truly become an instrument of procedural justice only if inclusive policies, capacity-building, and independent oversight mechanisms accompany it.

Table 2. The following table illustrates the comparison before and after digitisation:

Dimensions	Conventional Systems	Digital System	Key Changes
Data Logging	Manuals, physical archives	Digital integration	More accurate data
Access Information	Limited	Real-time	Increased transparency
Supervision	Internal	Auditable	Increased accountability
Dispute Resolution	Informal negotiations	Data-driven	Stronger objectivity

Source: Author's Interpretation

The table shows a fundamental shift from the conventional to the digital system in performance governance, with a direct impact on procedural quality and institutional relations. In the data recording dimension, conventional systems that rely on manual recording and physical records are prone to administrative errors and limited verification, whereas digital systems enable systematic data integration, resulting in higher accuracy and consistency. In terms of access to information, the shift from a limited to a real-time model increases transparency, as parties—especially farmers—can learn about results and processes

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more quickly and openly. In terms of oversight, internal mechanisms that were previously closed can now be audited through digital track records, thereby strengthening accountability and minimising potential conflicts of interest. Meanwhile, in the dispute resolution dimension, the shift from informal negotiations to data-driven mechanisms strengthens objectivity, as dispute resolution no longer relies on personal relationships but rather on documented evidence. Overall, these changes show that digitalisation is not just a technical innovation but also a procedural transformation that enhances transparency, accountability, and objectivity in governance systems.

Integrating Procedural Justice and Contemporary Islamic Economic Law

The integration of procedural justice with contemporary Islamic economic law provides a relevant normative framework for assessing the transformation of the rendition system from a conventional to a digital model. In the practice of sugarcane partnerships, the main problem is not only the yield received by farmers, but also the process by which yields are determined.[17] Procedural fairness emphasises transparency, participation, neutrality, and accountability at every stage of decision-making. These principles actually have a strong correspondence with the basic values of *muamalah* in Islam, which demand justice (*'adl*), *amanah* (integrity), and openness (*shafāfiyyah*) in economic relations.

From the perspective of Islamic economic law, justice (*'adl*) is not only understood as a proportionate outcome, but also as a process that does not harm one party. The Qur'an expressly commands the enforcement of justice in every transaction and social relation, including economic activities. This principle presupposes a balance of rights and obligations, as well as the prohibition of concealed exploitation within the institutional structure. In the conventional yield system, the information imbalance between companies and farmers often creates an asymmetrical relationship. Farmers are in the position of receiving results without having full access to the parameters that determine yield. When information is concentrated in one party, the potential for procedural unfairness increases, even though, nominally, the sharing of proceeds appears contractual.[18]

[17] Muhammad Prasetya Kurniawan et al., 'Analysis of Energy and Material Efficiency in Traditional Sugar Mills Using STEM-Based Approaches', *Jurnal Ilmiah Inovasi* 24, no. 3 (December 2024): 170–178, https://doi.org/10.25047/jii.v24i3.5705.

[18] Anny Nurbasari et al., 'Digital Entrepreneurial Marketing and Industrial Transformation: Evidence from Food and Beverage Small and Medium Industries in Indonesia toward Sustainable

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The principle of trust strengthens the ethical dimension in economic governance. *Amanah* demands that data management, measurement, and distribution of results be carried out honestly and accountably.[19] In manual practice, physical, archive-based recording opens the door to administrative error, manipulation, or at least suspicion of the objectivity of the process.[20] In some cases identified through field research, farmers expressed doubts about the consistency of laboratory test results because they lacked access to the measurement process. This kind of suspicion, although not always accompanied by evidence of manipulation, shows the weakness of procedural legitimacy. This is where digital systems have the potential to strengthen trust through a systematic, hard-to-change data track record without an electronic footprint.

Transparency (*shafāfiyyah*) also has a strong foundation in Islamic economic law. Transparency is needed to prevent *gharar*, the ambiguity or uncertainty that can harm one of the parties to a transaction.[21] In the jurisprudence literature of *muamalah*, *gharar* is seen as a factor that can cancel or at least injure the validity of the contract if it causes significant uncertainty. The conventional yield system, with limited access to information and minimal farmer participation in the testing process, may contain elements of *gharar* in a procedural sense. Farmers do not fully understand how yield figures are determined, what parameters are used, and how corrections are made in the event of discrepancies. When certainty is weak, the stability of economic relations is also disturbed.

Digitalization, in this context, can be understood as an instrument for reducing *gharar* by providing open, integrated, and documented data.[22] With systems that enable real-time logging, app access to test results, and traceable storage of historical data, the level of

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Development Goals (SDGs)', *Indonesian Journal of Science and Technology* 11, no. 2 (2026): 217–232, https://doi.org/10.17509/ijost.v11i2.89774.

[19] Nibrosu Rohid et al., 'Reconstructing the Legal Enforcement Framework for Digital Activism in an Era of Technological Disruption', *Nusantara: Journal of Law Studies* 5, no. 2 (2026): 881–901, https://doi.org/10.66325/nusantaralaw.v5i2.236.

[20] Arrahman Aditya et al., 'Strengthening the Legality and Digitalization of MSMEs in Increasing Visibility and Business Sustainability in Gemilang Jaya Village', *Jurnal Pengabdian Masyarakat Bestari* 4, no. 10 (November 2025): 751–762, https://doi.org/10.55927/jpmb.v4i10.449.

[21] A. Nehad and A. Khanfar, 'A Critical Analysis of the Concept of Gharar in Islamic Financial Contracts: Different Perspective', *Journal of Economic Cooperation and Development* 37, no. 1 (2016): 1–23.

[22] Risfiana Mayangsari, 'Consumer Protection in Muamalah Transactions', *Mizani Scientific Journal: Legal, Economic and Religious Discourse* 11, no. 1 (April 2024): 206–216, https://doi.org/10.29300/mzn.v11i1.4958.

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ambiguity is significantly reduced. Farmers have the opportunity to verify the data and raise evidence-based objections, not just assumptions. Thus, digitalisation not only increases technical efficiency but also strengthens the legitimacy of partnership contracts from a Sharia perspective.[23]

Furthermore, this integration can be analysed through the framework of *maqasid al-sharia*. One of the main purposes of sharia in the realm of *muamalah* is *hifz al-māl* (protection of property).[24] Property protection not only means guarding against outright theft or confiscation, but also preventing the reduction of rights through non-transparent mechanisms or unfair procedures. In sugarcane partnerships, the value of the yield directly determines the income of the farmers. Measurement errors, inaccuracies in records, or even the slightest administrative manipulation can affect the reduction of their economic rights.[25] Digital systems with accurate, auditable records serve as a preventive mechanism to protect these rights.

In addition to *hifz al-māl*, the principle of maqasid also includes efforts to maintain the public interest (*maslahah*).[26] Inclusive digitalisation can increase trust between farmers and companies, reduce conflicts, and strengthen the sustainability of partnerships. Field data show that in locations that have implemented digital systems relatively early, the intensity of yield-related disputes tends to decrease. This is not just due to changes in yield numbers, but also to increased trust in the process. Trust is a very important form of social capital in a partnership-based economy. In the Islamic perspective, trust is a consequence of the upholding of trust and justice.[27]

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[23] Fitriani Umar et al., 'Optimizing SiDesa and Making Ant Sugar as a Functional Food Product with High Economic Value', *Jurnal Abmas Negeri (JAGRI)* 6, no. 1 (June 2025): 20–29, https://doi.org/10.36590/jagri.v6i1.1334.

[24] Bambang, 'Ijtihad and the Dynamics of Islamic Legal Interpretation: An Epistemological Exploration in the Contemporary Context', *NUSANTARA: Journal Of Law Studies* 3, no. 1 (July 2024): 56–67, https://doi.org/10.5281/zenodo.17373912.

[25] Yudhistira Bagas Anggoro and Didit Purnomo, 'The Role of Digitalization in Agricultural Development in the Context of Realizing Food Security', *Al-Kharaj: Journal of Sharia Economics, Finance & Business* 7, no. 9 (September 2025): 3313–3328, https://doi.org/10.47467/alkharaj.v7i9.8717.

[26] Mohamad Subli et al., 'Green Investment in Contemporary Islamic Perspective: A Maqasid al-Syari'ah Analysis of the Mining Industry in Morowali', *MILRev: Metro Islamic Law Review* 4, no. 1 (April 2025): 156–83, https://doi.org/10.32332/milrev.v4i1.10269.

[27] Muhammad Faisal et al., 'Government Social Media Communication as a Political Public Relations Strategy for Advancing Social Welfare', *Nusantara: Journal of Law Studies* 5, no. 1 (April 2026): 421–435, https://doi.org/10.66325//nusantaralaw.v5i1.215.

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Nevertheless, the integration of procedural justice and Islamic economic law cannot be separated from the social context. Digitalisation is not an automatic solution. Digital literacy challenges, infrastructure limitations, and technology access gaps can create new forms of inequality if not anticipated.[28] In some study sites, elderly farmers or those with limited access to devices still rely on intermediaries to read digital data. If not accompanied by training and mentoring, digital systems can shift control from the company to the technical operator, without actually empowering farmers. Within the framework of maqasid, this kind of situation can reduce benefits if it is not regulated fairly.

Therefore, the implementation of a digital rendition system must be positioned within a comprehensive governance reform. The integration between the principles of procedural justice and Islamic economic law demands not only technical transparency but also substantive participation, easily accessible objection mechanisms, and independent oversight. When the values of '*adl*, *amanah*, and *shafāfiyyah* are internalised in institutional design, digitalisation can be a means of transformation that is in line with *maqasid al-sharia*. Thus, the digital system is not just a technological innovation but a normative instrument to strengthen the protection of rights, reduce uncertainty, and realise fairer, more sustainable partnership governance.

Table 3. The integration between procedural justice theory and Islamic economic law results in the following normative framework:

Principles of Procedural Justice	Principles of Islamic Economic Law	Implementation in Digital Systems
Voice	Deliberation	System-based objection access
Neutrality	Adl	Algorithmic standards and independent audits
Transparency	*Shafafiyyah*	Access real-time yield data
Accountability	Trust	Digital track record and trail audit

Source: Author's Interpretation

This table shows that when the theory of procedural justice is combined with the principles of Islamic economic law, a normative framework is formed that is not only compatible but also complementary in strengthening the governance of the digital revenue

[28] Shinta Melzatia et al., 'Digitalisation of Islamic Economy and Maqasid Sharia for Social Resilience and Welfare', *Jurnal Lemhannas RI* 13, no. 1 (March 2025): 89–102, https://doi.org/10.55960/jlri.v13i1.1153.

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system. The principle of voice, which emphasises the importance of participation in the decision-making process, finds its counterpart in the concept of deliberation, which requires meaningful involvement of the parties. In digital practice, this is realised through an officially recorded, system-based facility for objections and clarifications. The principle of neutrality intersects with the value of *'adl* (fairness), which demands objectivity and impartiality, so the application of transparent algorithmic standards and the possibility of independent audits are an important part of the system design. Meanwhile, transparency aligns with *shafāfiyyah*, which requires disclosure of information to avoid ambiguity (*gharar*). Access to real-time yield data provides greater certainty for farmers. Accountability is rooted in the principle of trust, reflected in the existence of digital track records and audit trails that can be verified. Thus, the digital rendition system not only represents technical modernisation but also serves as a concrete instrument for actualising the values of justice, openness, and responsibility in contemporary *muamalah* practices.

CONCLUSION

This study shows that the main problem in sugarcane partnerships in Indonesia lies in weak procedural governance for determining yields, not solely in technical measurement. Conventional systems tend to be characterized by information asymmetry, limited farmer participation, and a lack of transparency and independent monitoring. This condition impacts declining trust and the emergence of perceptions of injustice in partnership relationships. The implementation of a digital rendition system has proven capable of correcting most of these weaknesses through integrated data logging, greater access to information, and clear, verifiable audit trails. When analysed within the framework of procedural justice and contemporary Islamic economic law, digitisation can be an instrument that strengthens the principles of *'adl* (justice), *amanah* (trust), and *shafāfiyyah* (transparency), while supporting the protection of property (*hifz al-māl*) as part of *maqasid al-sharia*. With proper governance design, a digital rendition system not only improves efficiency but also strengthens legitimacy and balance in partnerships.

However, this study still has limitations, particularly regarding the scope of the region and the uneven implementation of digital systems. Therefore, further research is recommended to conduct a cross-regional or cross-commodity comparative study to

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examine the dynamics of digital governance implementation in a broader context. Quantitative studies on the impact of digitalisation on farmers' incomes and confidence levels are also important for strengthening empirical findings in a more measurable way. In addition, a more in-depth exploration of the integration of algorithms and technical standards of digital systems with the ethical principles of Islamic law can open up space for the development of technology-based governance models that are increasingly responsive to the values of substantive justice and the sustainability of the agrarian economy.

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AUTHOR CONTRIBUTIONS

Siwi Peni conceptualised the study, developed the research design, conducted field data collection, and prepared the initial draft of the manuscript. Mas Rahmah contributed to the development of the theoretical framework, particularly the integration of procedural justice and contemporary Islamic economic law, and participated in data analysis and the critical revision of the manuscript. Suparto Wijoyo, Maksym Maksimentsev, Muhamad Nafik Hadi Ryandono supervised the overall research process, provided methodological guidance, strengthened the legal analysis and argumentation, and reviewed and finalised the manuscript for publication. All authors have read and approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest. This research was conducted independently and in accordance with academic and ethical standards.

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AI USAGE STATEMENT

AI tools were used exclusively to assist with language refinement and formatting. The ideas, analyses, interpretations, and conclusions presented in this paper are entirely the authors' own. All AI-supported outputs were carefully reviewed and revised to ensure accuracy, originality, and academic integrity.

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