ISSN: 2755-8339

Journal of Business Research and Reports

SCIENTIFIC Research and Community

Research Article

Open Access

Orchestrating State-Owned Complementarities: Palm Co-Agrinas Synergy for a Higher-Value, Competitive, and Sustainable Indonesian Palm Oil Sector

Loso Judijanto

IPOSS Jakarta, Indonesia

ABSTRACT

Indonesia's palm oil sector is entering a phase in which future competitiveness depends less on extensive land expansion and more on productivity, value-chain integration, smallholder upgrading, downstream value creation, digital traceability, and credible sustainability governance. This qualitative literature review examines the emerging strategic relationship between PT Perkebunan Nusantara IV (PTPN IV PalmCo) and PT Agrinas Palma Nusantara (Agrinas), two state-owned enterprises with markedly different but potentially complementary resource configurations. PalmCo contributes established plantation operations, milling and downstream infrastructure, agronomic routines, digital systems, market channels, and farmer-partnership experience, whereas Agrinas combines an expanding portfolio of state-entrusted plantation assets with an asset-recovery mandate, engineering capability, and growing cooperative and public-policy networks. Drawing on recent literature published since 2020 and company-specific evidence, the article develops a State-Owned Enterprise Complementarity-Orchestration-Additionality (SCOA) framework. The findings identify nine major synergy domains: plantation stabilisation and sustainable intensification; milling and logistics; downstream value creation; bioenergy and circularity; smallholder and cooperative development; digital integration and traceability; sustainability and natural-capital governance; innovation and human-capital development; and financial and public-value optimisation. The analysis argues that synergy should be assessed through incremental additionality rather than organisational scale or memoranda of understanding. A phased governance roadmap and integrated performance scorecard are proposed to convert inter-SOE collaboration into measurable economic, social, environmental, and strategic outcomes.

***Corresponding author**
Loso Judijanto, IPOSS Jakarta, Indonesia.

Received: August 20, 2026; **Accepted:** August 25, 2026; **Published:** August 31, 2026

Keywords: Palm Co, Agrinas Palma Nusantara, State-Owned Enterprise, Palm Oil Value Chain, Resource Complementarity, Ecosystem Orchestration, Down Streaming, Smallholders, Sustainability, Public Value

JEL Classification: L32, Q13, Q18, Q42, Q56

Introduction

Background: Indonesia's Palm Oil Economy Beyond Plantation Production

Palm oil is one of the most consequential agro-industrial systems in Indonesia because it connects plantation production with rural livelihoods, food manufacturing, export earnings, industrial processing, oleochemicals, renewable energy, logistics, fiscal revenues, and regional development. The sector's significance cannot be understood through plantation area or crude palm oil output alone. It is better conceived as a multi-layered value chain in which biological productivity, processing efficiency, market organisation, farmer inclusion, public regulation, and ecological legitimacy interact continuously. Recent scholarship has therefore moved away from one-dimensional narratives of either economic benefit or environmental cost and toward more integrated assessments of distributional outcomes, land-use change, industrial upgrading, and governance [1-4].

This shift in perspective matters because Indonesia's next phase of palm oil development faces a different set of constraints from those that shaped the expansionary phase of previous decades. Higher yields, better planting material, timely harvesting, nutrient management, mechanisation, replanting, mill efficiency, logistics, and product upgrading are becoming more important than simple increases in planted area. Research on climate-smart intensification, smallholder production constraints, and replanting consistently shows that meaningful productivity gains require coordinated interventions rather than a single technical fix [5-9]. This implies that institutional capability - the capacity to organise knowledge, finance, infrastructure, data, and incentives - is becoming at least as important as land ownership.

The competitiveness agenda is also inseparable from sustainability. Greater productivity can reduce pressure for additional land in principle, but land sparing is not automatic. Without effective land governance, conservation rules, traceability, and safeguards, higher profitability may instead create incentives for further expansion. Recent studies on biodiversity, zero-deforestation commitments, riparian buffers, peat emissions, and landscape multifunctionality demonstrate that environmental outcomes depend on the institutional conditions surrounding production, not merely on technical efficiency [10-15]. Consequently, a modern competitiveness strategy for Indonesian palm oil must integrate

productivity, industrial upgrading, inclusion, and ecological governance rather than treating them as independent policy agendas.

The same logic applies to smallholders, who constitute a structurally important part of the sector but remain heterogeneous in land legality, market access, yields, finance, institutional affiliation, and readiness for certification. Certification programmes can improve market access and selected practices, yet studies repeatedly warn that the costs and capabilities required for participation can exclude less-organised farmers or generate uneven benefits [16-20]. Replanting creates an additional challenge because farmers face not only agronomic decisions but also several years of reduced or absent harvest income. For that reason, productivity and sustainability improvements require service ecosystems that combine planting material, extension, finance, offtake, traceability, institutional organisation, and transitional income support [21-23].

The Changing Configuration of State-Owned Palm Oil Enterprises

Within this changing sectoral environment, State-Owned Enterprises (SOEs) occupy a distinctive position. They are commercial organisations but also instruments through which governments may pursue food security, energy security, farmer development, asset optimisation, technological capability, and regional development. This hybrid position can create strategic advantages, including longer investment horizons and an ability to coordinate across fragmented markets, but it also introduces multiple objectives, political accountability, and the risk of mandate overload. Contemporary SOE research emphasises that public ownership does not automatically create developmental value; outcomes depend on governance quality, role clarity, managerial capability, and the institutional relationship between commercial and non-commercial objectives [24,25]. In the Indonesian context, state-owned entities have also been analysed as instruments of industrial policy and structural transformation, while more recent international research stresses that their contribution to innovation and public policy depends on combining strategic mandates with operational efficiency and credible governance [26,27].

PTPN IV PalmCo represents an established state-owned operating platform in the plantation economy. Its 2024 Annual Report describes an integrated palm oil business extending from planting and harvesting through milling, kernel processing, marketing, and downstream activities. The company reported 586,661 hectares of planted oil palm across 95 locations, while its broader managed palm oil area reached 699,846 hectares. It operated 56 palm oil mills with an aggregate processing capacity of 2,500 tonnes of fresh fruit bunches (FFB) per hour and produced approximately 11.39 million tonnes of FFB, 2.50 million tonnes of CPO, 459 thousand tonnes of palm kernel, and 139 thousand tonnes of PKO in 2024 [28]. The same report documents investments in digitalisation, including the PalmCo Business Cockpit, which integrates operational, marketing, financial, geospatial, and other information through ERP- and IoT-supported dashboards. These capabilities make PalmCo not merely a landholding entity but an operating system with routines, data, infrastructure, and institutional memory.

Agrinas Palma Nusantara has a fundamentally different profile. The company was formally transformed in 2025 from PT Indra Karya into an SOE focused on plantation management and construction consultancy, with an explicit mandate related to palm oil, downstreaming, and national food and energy security. Its 2025 Annual Report records the gradual receipt of approximately 1.7 million hectares of plantation land under state assignments, with 2025 production of around 1.13 million tonnes FFB, 197.93 thousand tonnes CPO, and 32.90 thousand tonnes kernel. The report also notes that plantation-segment results had not yet been recognised in the company's 2025 financial statements because asset consolidation and operational initiation were still in progress [29]. This distinction is important: land entrusted to a state enterprise is not equivalent to planted productive area, legally uncomplicated land, or a fully operating estate.

The scale of Agrinas' mandate continued to change rapidly in 2026. In May 2026, the company announced an additional 2.37 million hectares of state-recovered land, bringing the total entrusted area to approximately 4.12 million hectares. The company subsequently reported that approximately 4.11 million hectares were under its management as of July 2026, while emphasising that 2025 plantation operational surplus was distinct from corporate net profit [30,31]. These developments greatly increase the strategic importance of operationalisation, asset triage, legality, infrastructure rehabilitation, and managerial capacity. They also make simple comparisons of 'hectares managed' analytically misleading unless accompanied by information on crop condition, legal status, planted area, yield, infrastructure, and economic recognition.

From Potential Cooperation to an Emerging Strategic Relationship

The empirical premise of this article is stronger than a hypothetical proposal for collaboration. Agrinas' Annual Report records a formal cooperation agreement with PTPN IV PalmCo dated 24 February 2025. Under that arrangement, PalmCo was expected to provide operational and plantation-management assistance for plantations entrusted to Agrinas, with the stated objectives of improving productivity, increasing business value, and supporting sustainable welfare In October 2025 the relationship acquired a downstream dimension when PalmCo publicly stated its readiness to collaborate with Agrinas to strengthen production of Minyakita, drawing on PalmCo's refinery capacity and infrastructure [32]. The analytical question is therefore not whether the two SOEs could cooperate in principle, but how an emerging relationship can be transformed into a coherent and measurable strategic architecture.

This distinction matters because collaboration is not synonymous with synergy. Strategic-alliance research demonstrates that complementary resources may create potential value, but actual value depends on the governance mechanisms through which resources are combined, knowledge is transferred, incentives are aligned, and interdependence is managed. Resource complementarity may even generate new bottlenecks when one partner becomes dependent on the other's capabilities or when coordination costs exceed the benefits of combination [33-35]. For two state-owned enterprises, the challenge is more demanding because commercial value must coexist with accountability, public mandates, procurement integrity, social legitimacy, and environmental safeguards.

The article therefore advances a central proposition: the developmental value of PalmCo-Agrinas cooperation will arise not from the aggregation of state-controlled assets per se, but from the deliberate orchestration of complementary capabilities, productive assets, processing infrastructure, knowledge, digital systems, farmer institutions, downstream facilities, and sustainability governance. The paper asks four questions: first,

how do the resource and capability configurations of PalmCo and Agrinas create opportunities for strategic synergy across the palm oil value chain? Second, through which mechanisms could the collaboration generate additional economic and public value? Third, what institutional, legal, organisational, financial, social, and environmental constraints could prevent potential synergy from materialising? Fourth, what governance architecture, sequencing, and performance indicators are required to convert inter-SOE cooperation into measurable developmental additionality?

The contribution is threefold. Empirically, the article places two rapidly evolving Indonesian SOEs within a single value-chain analysis. Conceptually, it develops a State-Owned Enterprise Complementarity-Orchestration-Additionality (SCOA) framework that integrates resource complementarity, ecosystem orchestration, SOE governance, and public-value logic. Practically, it proposes a phased portfolio of synergy mechanisms and an integrated performance system that can help shareholders, managers, regulators, farmer organisations, and other stakeholders distinguish genuine additionality from organisational expansion or administrative cooperation.

Literature Review

Palm Oil as an Integrated Agro-Industrial Value Chain

The oil palm value chain begins with land, seeds, nurseries, and plantation management but rapidly becomes an industrial system because FFB is perishable and must be processed quickly. Harvesting intervals, road quality, transport distance, queue time, mill utilisation, oil extraction rates, and quality control therefore link agronomic performance to industrial economics. Research on Indonesian smallholders shows that seemingly modest changes in harvest frequency or nutrient balance can materially affect yields and quality, while poor agronomic timing can create losses that cannot be recovered downstream. The implication is that upstream and midstream coordination should be analysed jointly [36].

Industrial upgrading extends beyond improving extraction rates. Downstreaming can take the form of process upgrading, product upgrading, and functional upgrading. Process upgrading reduces cost or improves quality within existing production; product upgrading moves into higher-value derivatives; functional upgrading adds new capabilities such as refining, oleochemicals, bioenergy, product formulation, logistics, or branded consumer distribution. Studies of Indonesian palm oil policy show that downstreaming can increase domestic value capture, but its effectiveness depends on market structure, technology, feedstock economics, investment discipline, and the ability to move beyond volume-based targets [37,38]. An industrial plant that operates below economic capacity or produces a low-margin derivative does not automatically represent developmental upgrading.

Bioenergy adds another layer of complexity. Palm oil is central to Indonesia's biodiesel strategy, but lifecycle performance depends on feedstock origin, land-use change, process energy, methane management, and technology configuration. Reviews of palm-based bioenergy highlight a large technical potential in biodiesel, biogas, biomass, and advanced fuels, while also documenting the importance of lifecycle assessment and careful evaluation of energy returns, for example, demonstrate why renewable-energy strategies should consider energy return on investment rather than assuming that all biofuel pathways are equally beneficial. These findings support a stage-gated approach to PalmCo-Agrinas downstream investment rather than a blanket preference for capital-intensive processing [39-42].

Sustainable Intensification, Land Governance, and Ecological Limits

Sustainable intensification is especially relevant to a partnership involving a mature operator and a rapidly expanding asset manager. Monzon et al. argue that climate-smart intensification of oil palm can combine yield improvement with reduced environmental pressure when agronomic interventions are coupled with broader safeguards. Zhao et al. similarly show that replanting and yield growth can help offset production decline associated with ageing stands. At the smallholder level, however, show that the feasibility of better management depends on finance, knowledge, labour, and institutional support. Recent Indonesian evidence further indicates that replanting participation is strongly shaped by financing constraints, land documentation, farming experience, and the practical capacity to implement good agricultural practices [43]. Productivity improvement is therefore an organisational and institutional challenge as much as an agronomic one.

The environmental literature simultaneously cautions against treating productivity as a substitute for land-use governance. Xu et al. document recent oil palm expansion into carbon-rich forests, while Fleiss et al. show that zero-deforestation rules can have different biodiversity implications across tropical grassy and dry forest systems. Landscape-level research finds that diversified habitat elements, riparian protection, and tree islands can retain important ecological functions inside production landscapes [44]. At the smallholder scale, environmental-efficiency evidence also indicates that biodiversity loss and output are not mechanically linked and that appropriately designed incentive instruments can improve conservation performance without abandoning livelihood objectives [45]. Peat research further demonstrates the importance of greenhouse-gas accounting beyond carbon dioxide because methane and nitrous oxide fluxes can materially affect plantation climate footprints. Any large-scale operationalisation of recovered or entrusted assets consequently requires land-status verification, HCV/HCS and peat screening, riparian safeguards, and explicit restoration criteria before production intensification.

Agroforestry and mosaic approaches can also reduce the false choice between production and conservation. Purwanto et al. identify agroforestry as a policy option for oil palm production in forest-zone contexts, while Grass et al. show that tropical smallholder landscapes involve real trade-offs between multifunctionality and profit rather than a simple win-win frontier. Fosch et al. add that replanting unproductive oil palm with smallholder plantations can contribute to Sustainable Development Goals when land-use choices are appropriately targeted. The broader lesson is that PalmCo-Agrinas collaboration should not use a single operating template for heterogeneous land. A differentiated landscape approach is more consistent with ecological evidence and the legal diversity of Agrinas' entrusted asset portfolio [46,47].

Certification, Traceability, and the Politics of Sustainability

Sustainability standards have become deeply embedded in palm oil competitiveness. Brandi describes the interaction between private and public governance in palm oil standards, illustrating that certification operates within a broader regulatory ecosystem. In Indonesia, the relationship between ISPO, state authority, market expectations, and transnational standards has generated both policy innovation and institutional ambiguity. The result is that compliance should be understood not as a stand-alone audit exercise but as a system of data, incentives, enforcement, and institutional capacity [48-50].

Smallholder evidence reinforces this point. Watts et al. identify persistent barriers to certification, including cost, documentation, organisational readiness, and legal constraints. Ogahara et al. find that the empirical evidence on smallholder sustainability initiatives remains mixed and that implementation gaps are substantial. Denashurya et al. show that farmers' adoption of sustainable practices depends on perceived benefits, institutional support, and capability, while de Vos et al. (2023a) document wide variation in pre-certification conditions among independent smallholders. More recent evidence indicates that certification and access to certified markets remain uneven, with contract and independent smallholders facing different pathways and benefits [51,52].

These findings have direct implications for synergy design. Supply-chain resilience research during the COVID-19 period also showed that shocks can expose coordination weaknesses across sustainable palm oil systems, reinforcing the value of integrated data and supplier-management capabilities [53]. A shared traceability platform should not be limited to exclusionary compliance screening. It can become a developmental service infrastructure that links geospatial identity, planting material, agronomic records, offtake, payment, finance, replanting, training, and certification. This is particularly relevant where PalmCo possesses digital operating systems and farmer-partnership experience while Agrinas is developing new cooperative relationships. Traceability can then shift from a defensive market-access function toward a capability-building mechanism.

Smallholder Inclusion, Welfare, and Institutional Organisation

Economic effects of oil palm are heterogeneous across households and landscapes. Mehraban et al. (2021) show that oil palm cultivation may improve welfare while also altering households' exposure to economic risk. Santika et al. find that sustainability certification can be associated with changes in village well-being and poverty, but impacts vary by context. Rowland et al. demonstrate that oil palm development also has gendered effects on time use, reminding policymakers that aggregate income measures may conceal unequal household burdens. Li argues that securing smallholder livelihoods without additional deforestation requires institutional pathways that improve returns from existing farms rather than relying on continued frontier expansion [54-56].

Recent work increasingly focuses on farmer resilience and organisational models, while multi-province sustainability assessments underline that smallholder outcomes vary substantially across local production and institutional conditions. emphasise the importance of strengthening smallholder resilience to industrial change, while examine corporate-farming approaches for more sustainable smallholder supply chains. Wong et al. demonstrate how remote sensing and multi-criteria assessment can support sustainability evaluation at smallholder scale. Together, these studies suggest that a PalmCo-Agrinas farmer platform should not be designed solely to secure FFB supply. Its developmental objective should be to raise farmer productivity and income, lower transaction costs, improve access to replanting and finance, and enable participation in traceable markets [57,58].

State-Owned Enterprises, Public Value, and Mandate Design

SOEs are often expected to reconcile commercial discipline with strategic public objectives. Rygh and Benito emphasise the interaction between governmental goals and SOE international strategies, while Panibratov and Klishevich situate state-owned multinationals within the broader debate on state capitalism. Although the institutional settings differ from Indonesian plantation SOEs, a common lesson is that multiple principals and multiple goals can create ambiguity unless objectives are translated into explicit governance mechanisms and performance measures. Research on sustainable corporate governance further suggests that long-term state ownership can support sustainability but is not sufficient without effective stewardship and accountability mechanisms. Recent empirical studies of SOEs also show that stronger operation-and-investment accountability can improve audit quality, internal control, investment efficiency, and ESG performance, reinforcing the importance of clear responsibility for public assets and strategic investments [59-61].

For plantation SOEs, circular economy and sustainability add further dimensions. Trisyulianti et al. propose a sustainability performance-management framework for circular-economy implementation in state-owned plantation enterprises, showing the importance of integrating economic, environmental, and organisational indicators [62]. This literature supports an analytical distinction between commercial performance, sectoral contribution, and developmental impact. Profit is necessary for resilience, but a profitable inter-SOE transaction is not necessarily developmentally additional if the same outcome could have been achieved more cheaply by one firm or a competitive private supplier. Conversely, an activity with a policy mandate may generate public value even when private financial returns are modest, provided that the mandate, funding mechanism, and accountability framework are explicit.

Strategic Alliances, Complementarity, and Ecosystem Orchestration

The strategic-alliance literature provides a useful vocabulary for analysing PalmCo and Agrinas. Di Dio and Correani show that alliances may generate value through cost reduction and quality improvement, but the benefits depend on the structure of cooperation. Jin and Wang demonstrate that resource complementarity can improve joint-venture performance while partner differences simultaneously create integration challenges. Kumar et al. use a resource-orchestration lens to explain how hub firms help develop innovation capabilities by mobilising and coordinating dispersed resources. These insights are highly relevant when one SOE possesses mature operational routines and another controls a rapidly expanding, heterogeneous asset base [63,64].

Ecosystem research adds two further insights. First, complementarity creates interdependence: the more value one partner derives from another's infrastructure or capability, the more important governance becomes. Agarwal and Kapoor formalise this tension as a value-creation trade-off between leveraging complementarities and managing interdependencies. Second, ecosystems require active orchestration rather than passive coexistence. Shen et al. identify strategic design, relational coordination, resource integration, technological leverage, and innovation practices as recurring orchestration mechanisms. Cui and Han similarly connect resource orchestration with sustainability-oriented ecosystem strategy [65].

Digital platforms can become part of this orchestration. Jovanovic et al. argue that platform value emerges through the co-evolution of architecture, services, and governance. Applied to plantation SOEs, this means that a shared digital platform cannot simply be a dashboard. It requires agreed data standards, decision rights, access protocols, user incentives, cybersecurity, and processes that connect data to operational action. Palm Co's Business Cockpit

and Agrinas' recent digital-procurement initiatives could therefore be viewed as building blocks for interoperability rather than separate digital transformations [66].

Conceptual Synthesis: The Scoa Framework

The literature indicates that four concepts must be linked. Complementarity concerns what each SOE brings: assets, capabilities, routines, mandates, networks, and infrastructure. Orchestration concerns how those resources are combined through contracts, governance, standards, knowledge transfer, shared services, and investment. Additionality asks what incremental value exists because cooperation occurs rather than each organisation acting separately. Safeguarded public value asks whether incremental outcomes are socially legitimate, environmentally credible, fiscally responsible, and consistent with food, energy, farmer, and regional-development objectives.

Figure 1 should be read as a map of asymmetry rather than a claim that one company is 'stronger' than the other. PalmCo's principal contribution lies in accumulated operational systems, processing infrastructure, market interfaces, digital tools, and sustainability routines, whereas Agrinas' strategic significance lies in an expanding state-entrusted asset portfolio, an asset-rehabilitation mandate, engineering capabilities, and new public-policy and cooperative networks. The potential synergy arises from connecting these different endowments without erasing the distinct accountability of each SOE.

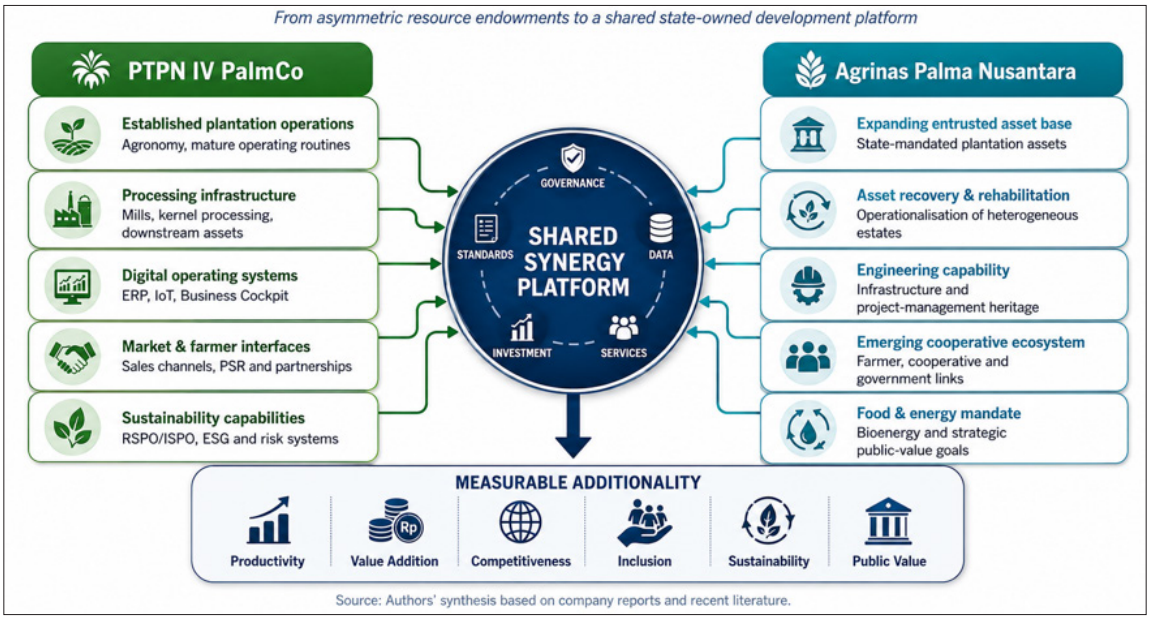

Figure 1: Complementary Resource Architecture of PalmCo and Agrinas

The figure highlights why organisational duplication would be a weak interpretation of synergy. If Agrinas recreates every PalmCo capability independently, or if PalmCo expands into functions that Agrinas is specifically mandated to perform, the state may finance parallel systems without creating additional value. The more promising model is a shared platform in which selected capabilities are transferred, shared, contracted, or jointly invested while legal accountability remains clear. This reasoning provides the conceptual foundation for the SCOA framework developed later in the analysis.

Method

Review Design and Rationale

This study employs a qualitative narrative-integrative literature review with thematic synthesis. It is intentionally not presented as a systematic literature review, meta-analysis, or PRISMA-based evidence synthesis. The research questions span agronomy, agricultural economics, strategic management, state-owned enterprise governance, supply chains, smallholder development, sustainability, digital platforms, downstream industrial policy, and bioenergy. A qualitative integrative design is therefore more appropriate for building a cross-disciplinary explanation than an exhaustive review of a narrowly defined intervention. Methodological literature recognises that integrative and qualitative reviews can support conceptual development when the search, selection, and synthesis logic is transparent and the authors distinguish interpretation from empirical proof.

The review focuses primarily on peer-reviewed literature published from 2020 through August 2026. This time boundary was selected to capture recent developments in sustainable palm oil governance, smallholder certification, landscape ecology, downstreaming, ecosystem strategy, and contemporary SOE governance while maintaining a current evidence base. Older foundational theory was deliberately minimised in order to preserve the review's contemporary orientation. Corporate reports and official company releases are not treated as substitutes for peer-reviewed evidence; they are used only to establish company-specific facts, reported performance, formal mandates, and the chronology of emerging PalmCo-Agrinas cooperation [67,68].

Literature Identification and Selection

Literature was identified iteratively around several thematic clusters: Indonesian palm oil value chains; productivity and sustainable intensification; replanting and smallholder economics; certification and traceability; biodiversity, peat and land governance; bioenergy and circular economy; SOE strategy; strategic alliances and resource complementarity; ecosystem orchestration; digital platforms; and qualitative review methodology. Sources were prioritised when they were published in established peer-reviewed journals, provided empirical or conceptual relevance to Indonesia

or comparable resource-based sectors, and contributed directly to the analytical framework.

Selection was purposive rather than exhaustive. The objective was not to estimate a pooled effect size but to identify convergent findings, tensions, causal mechanisms, and implementation conditions that could inform a coherent analysis of inter-SOE synergy. Backward and forward citation logic was used conceptually to identify related streams, and contradictory findings were retained where they clarified trade-offs. Particular attention was given to studies that challenge simplistic assumptions, such as the idea that certification automatically benefits all farmers, higher yield automatically produces land sparing, or downstream capacity automatically generates higher domestic value added.

Corporate Evidence and Evidence Hierarchy

The two principal company documents examined were the PTPN IV Annual Report 2024 and the PT Agrinas Palma Nusantara Annual Report 2025. These reports provide the baseline for operational scale, production, infrastructure, digital systems, formal corporate strategy, and the cooperation agreement signed in February 2025. More recent official disclosures were used selectively to update rapidly changing facts, notably Agrinas' expansion of entrusted land in 2026, its cooperative-based agribusiness initiatives, and PalmCo-Agrinas downstream cooperation related to Minyakita. Corporate disclosures were interpreted as primary case evidence and were not used to infer causal developmental impact without support from independent literature.

A hierarchy of evidence was applied. Peer-reviewed research is used for general analytical claims about productivity, alliances, certification, ecology, public value, and governance. Company reports are used for company-specific factual statements. Official news releases are used for dated events and stated intentions. Author inferences - for example, the proposition that shared mill utilisation may avoid duplicated capital expenditure - are explicitly framed as analytical propositions rather than observed impacts. This distinction is essential because neither corporate reporting nor a literature review can independently establish the causal impact of PalmCo-Agrinas synergy.

Thematic Coding and Synthesis

The literature and company evidence were organised through two-stage thematic coding. First-cycle codes included asset status, agronomy, replanting, FFB supply, milling, logistics, downstreaming, bioenergy, smallholders, cooperatives, certification, traceability, digitalisation, land legality, biodiversity, finance, governance, human capital, and public value. Second-cycle synthesis grouped these codes into nine synergy domains: plantation stabilisation and sustainable intensification; mill utilisation and logistics; downstream value creation; bioenergy and circular economy; smallholders and cooperatives; digital integration and traceability; sustainability and natural-capital governance; innovation and human capital; and financial and public-value optimisation.

Each thematic domain was assessed through a common analytical template: complementary resource, orchestration mechanism, expected additionality, implementation constraint, safeguard, and measurable indicator. This template prevents the analysis from treating cooperation as inherently beneficial. Instead, every synergy proposition must specify how value is created, what could prevent it, and how performance would be observed.

Results: Thematic Findings on Palmco-Agrinas Synergy

Complementary Resource Configurations and the Logic of Role Differentiation

The most important finding is that PalmCo and Agrinas are not naturally identical competitors. Their current resource configurations are asymmetric. PalmCo enters the relationship with mature plantation systems, processing infrastructure, agronomic expertise, established commercial channels, a functioning digital operating architecture, sustainability systems, and experience in farmer partnerships. Agrinas enters with a rapidly expanding portfolio of state-entrusted assets, an explicit asset-recovery and optimisation mandate, inherited engineering and construction-consulting capability, and a developing network of cooperative, government, university, and food-energy partnerships. The existence of overlap - both are involved in plantation management and downstream ambitions - does not remove the complementarity; it increases the importance of defining boundaries.

This asymmetry has two implications. First, the quickest route to value creation is likely to involve capability transfer and shared infrastructure rather than building complete parallel organisations. Second, a single governance model is unlikely to fit every project. Agronomic technical assistance, shared mill processing, downstream investment, digital interoperability, farmer services, and joint R&D involve different risk profiles and therefore require different contractual vehicles. Alliance theory supports such differentiated governance because the optimal form depends on asset specificity, interdependence, knowledge transfer, and the need for control. Recent research on Indonesian state-owned holdings reaches a complementary conclusion, identifying mandate-specific governance, organisational alignment, integration capability, and multidimensional performance measurement as critical conditions for successful post-establishment integration [71].

Table 1 summarises the principal complementarity configuration. The table is not intended to rank either company, but to identify where combined capabilities might be more valuable than independent replication.

Table 1: Comparative Resource and Capability Profile of Palm co and Agrinas

Dimension	PalmCo contribution	Agrinas contribution	Primary synergy implication
Plantation operations	Established agronomic routines, field organisation, mature operating systems	Large and heterogeneous entrusted plantation portfolio requiring stabilisation	Technical assistance, SOP transfer and estate triage
Processing	Large network of mills and kernel-processing assets	New or recovered estates with varying mill access and condition	Geographic mill matching and selective shared processing
Digital systems	ERP/IoT-linked Business Cockpit and operational dashboards	New digital governance and procurement systems; opportunity to build from clean architecture	Interoperability, shared data standards and geospatial registry
Downstream	Existing processing, market channels and transformation agenda	Food- and energy-security mandate; new feedstock opportunities	Joint feasibility studies, offtake and selected co-investment
Engineering	Plantation and mill engineering capability	Strong construction-consulting and infrastructure heritage	Rehabilitation, roads, utilities and project management
Smallholders	PSR, plasma and FFB sourcing experience	Emerging cooperative-based agribusiness partnerships	Integrated farmer service platform
Sustainability	Certification systems and established ESG functions	Ability to embed safeguards into newly operationalised assets	Shared standards, traceability and natural-capital protocols
Public mandate	Food/energy security and state-owned plantation consolidation	State asset recovery, food/energy security and social-development mandate	Public-value additionality and coordinated policy execution

Synergy Domain I: Plantation Stabilisation and Sustainable Intensification

Agrinas' most urgent challenge is not necessarily new downstream investment but the stabilisation and classification of heterogeneous estates. A state-recovered plantation portfolio may contain productive mature stands, immature stands, neglected areas, degraded infrastructure, unresolved tenure, social claims, environmental liabilities, and land that should not be cultivated. Treating these assets as homogeneous would create both economic and sustainability risks. The first synergy mechanism should therefore be a joint estate-triage protocol that combines legal, agronomic, engineering, social, ecological, and financial diagnostics.

PalmCo can contribute operating standards for crop census, harvesting, fertilisation, drainage, roads, mill-interface management, and performance monitoring. Agrinas can contribute site-specific legal and asset-recovery information, engineering resources, and authority over entrusted assets. The additionality would arise from shortening the time between asset handover and reliable operation, reducing avoidable crop losses, and avoiding inappropriate capital expenditure before estate conditions are understood. Evidence from intensification and replanting research suggests that yield recovery depends on correctly diagnosing the limiting factor; generic input increases can be inefficient when problems arise from crop age, harvest timing, nutrient imbalance, labour, access roads, or planting material. Evidence on replanting participation further reinforces the need to combine agronomic assistance with financing, land-document support, and institutional facilitation rather than treating replanting as a purely technical intervention.

The sustainability safeguard is a productivity-before-expansion rule. Land should be classified into productive rehabilitation, replanting, restoration, infrastructure, social-use, and no-go categories before investment. This is consistent with the literature showing that the environmental benefit of intensification depends on binding land-use safeguards. A high-yield estate cannot be considered a successful synergy project if production gains are accompanied by unresolved deforestation, peat, or social-conflict risks.

Synergy Domain Ii: Mill Utilisation, Logistics, And FFB Optimisation

FFB perishability makes geography central to synergy. Palm Co's network of mills could create value for Agrinas estates where transport distance and available capacity make shared processing economical. The relevant analytical unit is therefore the mill catchment rather than the corporate boundary. A GIS-based optimisation model could map Agrinas estates, Palm Co mills, third-party mills, road condition, estimated FFB volumes, processing capacity, queue times, and quality losses. The objective would be to identify cases where processing agreements or KSO-style arrangements generate better economics than building new mills.

The additionality mechanism is avoided duplication of capital expenditure, faster operationalisation, and improved asset utilisation. This is particularly important because mill construction locks in capital and requires stable long-term FFB supply. Shared utilisation could also create a bridge strategy while Agrinas determines which estates warrant dedicated processing infrastructure. However, the arrangement would require transparent transfer pricing, quality standards, scheduling rules, and clear responsibility for product ownership. Otherwise, inter-SOE transactions could obscure rather than improve performance.

PalmCo's own risk reporting identifies low third-party, plasma, and farmer FFB supply as a strategic risk and references partnership-based replanting and more responsive pricing as mitigation. This creates a second layer of complementarity: Agrinas' expanding cooperative relationships could broaden reliable FFB supply, while PalmCo's purchasing and processing systems could provide market discipline. The result could be a network in which estate and smallholder production is routed to the most efficient mill regardless of company boundary, subject to legal and competition safeguards.

Synergy Domain III: Downstream Value Creation

The October 2025 Minyakita initiative illustrates how upstream cooperation can evolve into consumer-facing value creation. PalmCo stated that its capacity and infrastructure could support Agrinas in expanding affordable cooking-oil production. This is

strategically significant because it provides an early test of whether two SOEs can combine feedstock, refining, distribution, and a public food-security objective without duplicating assets. Yet the case should be treated as a pilot rather than evidence that all downstream integration will be beneficial.

Downstream projects should be screened by domestic value added per tonne, operating margin, market demand, technology intensity, skilled employment, import substitution, export potential, and lifecycle performance. The objective is not simply to maximise the number of processing stages. show why downstream policy can support domestic value creation, while Purnomo et al. emphasise the importance of considering the full value-chain dynamics rather than isolated investments. Rosyadi et al. further demonstrate that export competitiveness remains sensitive to market structure and destination-country conditions.

A portfolio approach is therefore preferable. Some activities may be suitable for simple offtake agreements; others may justify joint investment where feedstock scale and market access create genuine additionality. Potential areas include cooking oil, RBD olein and stearin, PKO-based derivatives, oleochemicals, biodiesel feedstock optimisation, and selected specialty products. The choice should be driven by comparative capability and market economics rather than institutional symbolism.

Figure 2 translates this logic into an integrated value-chain architecture. The call-out is deliberately sequential: the largest long-run value may appear downstream, but downstreaming becomes fragile if the underlying assets, agronomy, FFB logistics, legality, and traceability are unstable. The figure therefore places digital integration and sustainability safeguards underneath the entire chain rather than as late-stage compliance functions.

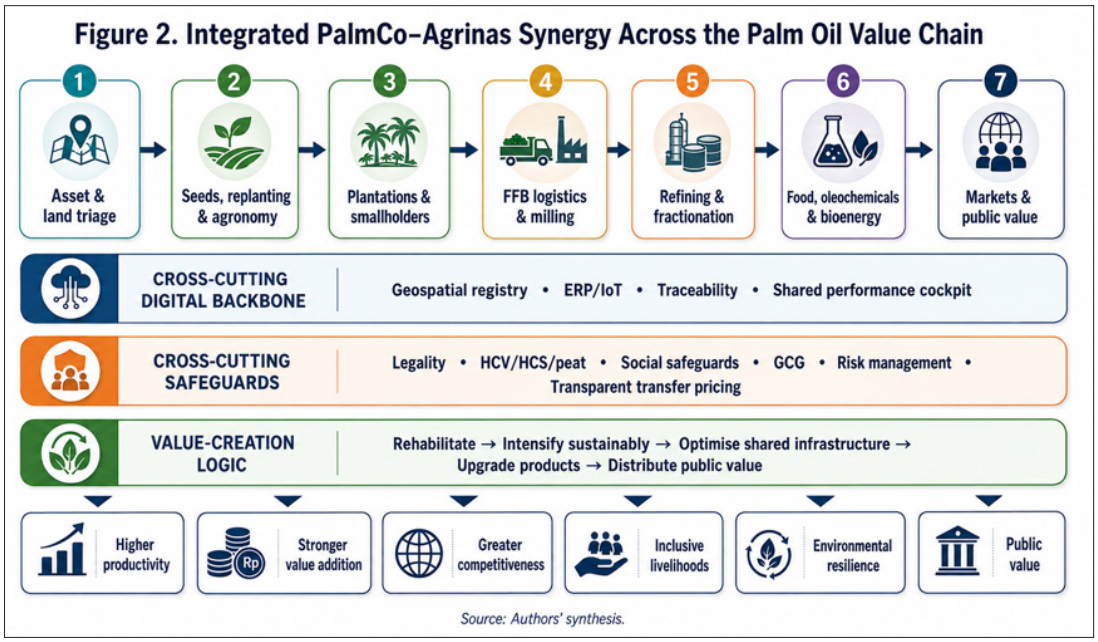

Figure 2: Integrated Palm Co-Agrinas Synergy Across the Palm Oil Value Chain

The value-creation logic in Figure 2 is 'rehabilitate, intensify sustainably, optimise shared infrastructure, upgrade products, and distribute public value'. This sequence does not imply that every estate must move through every processing stage under common ownership. Instead, it shows that strategic integration can be achieved through interoperable contracts, shared standards, infrastructure access, and coordinated investment. Markets and public value sit at the end because the test of synergy is not internal organisational activity but improved outcomes for customers, farmers, workers, the state, and the environment.

Synergy domain IV: Bioenergy and Circular Bioeconomy

Palm oil creates large biomass and effluent streams that can become either environmental liabilities or productive resources. POME methane capture, biogas, empty fruit bunch utilisation, palm kernel shells, fibre, compost, biochar, and higher-order biorefinery pathways represent potential collaboration areas. document the breadth of palm-based bioenergy options, while Wahyono et al. show why lifecycle assessment is necessary to compare environmental outcomes across feedstocks and technologies. Indonesia-specific research also identifies substantial opportunities to upgrade oil palm biomass through thermochemical conversion, biochar, and other value-adding pathways, although market development, logistics, and technology economics remain decisive constraints. More recent circular-bioeconomy research similarly emphasises that decarbonisation benefits depend on integrated waste management, technology readiness, and supportive investment and policy frameworks rather than on waste valorisation claims alone [73].

A PalmCo-Agrinas platform could generate scale economies by standardising project design, vendor qualification, measurement protocols, and finance structures across multiple sites. PalmCo's operating mills provide experience and reference sites; Agrinas' growing asset base could create a pipeline for replication. However, technology-stage discipline is essential. Projects should move through laboratory, pilot, demonstration, commercial, and replication gates, with explicit metrics for energy yield, methane abatement, capital cost, operating reliability, and payback. Prananta and Kubiszewski reinforce the importance of evaluating energy return and system-wide performance rather than relying on nominal renewable-energy classifications.

Circularity can also reduce plantation input costs. Composting and land application of appropriately treated residues can return nutrients and organic matter to soils, while biomass energy can reduce fossil-fuel use in mills. The additionality case becomes strongest when waste management, energy savings, emissions reduction, and soil improvement occur simultaneously. This is precisely the type of multi-dimensional performance logic advocated for state-owned plantation enterprises by Trisyulianti et al.

Synergy Domain V: Smallholders, Plasma, and Cooperatives
Smallholder development is one of the strongest areas for developmental additionality because neither company should be assessed solely by estate output. PalmCo already has experience with plasma, FFB purchasing, and the People's Palm Oil Replanting programme, while Agrinas signed a memorandum of understanding with Indonesia's Ministry of Cooperatives in July 2026 to develop a cooperative-based plantation agribusiness ecosystem supporting food and energy security. The combination creates an opportunity to design a unified farmer-service platform rather than multiple disconnected interventions [74].

Such a platform could integrate farmer registration, geospatial mapping, land-document support, seed and nursery access, agronomic extension, replanting finance, temporary income solutions, fertiliser planning, harvesting services, digital payment, FFB offtake, grievance mechanisms, traceability, and certification. The economic logic is that better farmer capability can improve both household welfare and mill supply. The governance logic is that services should be linked to transparent eligibility and measurable outcomes rather than clientelistic allocation.

The literature strongly supports this systems approach. show that certification barriers are intertwined with organisational and legal constraints. argues for livelihood improvement without additional deforestation. demonstrate the potential of corporate-farming models, and Wong et al. show how technology can strengthen farm-level sustainability assessment. Together, these studies suggest that the correct KPI is not simply the number of farmers enrolled but measurable changes in yield, income, replanting completion, traceability, finance access, and grievance outcomes.

Gender should also be visible within the platform. Rowland et al. show that oil palm affects household labour allocation and time use differently across genders. Programmes that increase formal farmer income but intensify unpaid care or farm labour for women may have ambiguous welfare effects. Farmer-service design should therefore track participation, decision-making, training access, and benefit distribution by gender where practical.

Synergy Domain VI: Digital Integration and Traceability
Digital integration may be one of the least capital-intensive but highest-leverage synergy areas. PalmCo has already developed a multi-level Business Cockpit linking head office, regional, and unit dashboards, while Agrinas has been building new digital governance systems, including an Integrated Procurement System launched in July 2026. A shared architecture need not mean a single database or a loss of corporate autonomy. It can mean interoperable identifiers, geospatial standards, common definitions, API-based data exchange, and agreed performance metrics.

The first priority should be a geospatial state-asset registry for Agrinas' entrusted land, with layers for legal status, operator status, crop age, yield, planted area, infrastructure, mill catchment, HCV/HCS, peat, conflict, community claims, and rehabilitation plan. PalmCo's operating data can then be linked at appropriate levels for technical assistance, mill scheduling, or joint projects. The additionality is improved decision speed, reduced information asymmetry, and a common evidence base for investment allocation.

Traceability should be built into this architecture from the beginning. warn that zero-deforestation and certified supply-chain initiatives can exclude smallholders when traceability requirements are detached from capability support. A developmental platform would therefore link compliance data to extension, replanting, finance, and market access. Jovanovic et al. provide a useful conceptual parallel: platform value increases when architecture, services, and governance evolve together. For PalmCo and Agrinas, this implies that data interoperability should be governed as an operating capability with explicit standards, incentives, access rights, cybersecurity responsibilities, and feedback into field-level decisions.

Synergy Domain VII: Sustainability and Natural-Capital Governance
Agrinas' asset portfolio creates a particular sustainability challenge because some assets originate from state recovery of areas associated with regulatory or land-use problems. Operational responsibility should not convert problematic historical practices into accepted future baselines. The partnership therefore requires a joint protocol for legality, HCV/HCS, peat, riparian zones, deforestation exposure, biodiversity, water, soil, and social conflict before productivity targets are imposed.

PalmCo can contribute established certification and sustainability routines, but the model should go beyond certification. show that formal standards operate within contested governance systems, while demonstrate that plantation landscape design can materially affect biodiversity. A joint natural-capital framework could therefore use certification as a minimum governance layer while adding site-specific restoration, biodiversity, emissions, and community metrics.

This domain also demonstrates why public value must be net of externalities. A project that improves EBITDA but increases unresolved land conflict, peat emissions, or biodiversity loss should not pass an additionality test. Conversely, a restoration or methane-capture project with modest direct profit may be developmentally valuable if environmental benefits are measurable and the funding mechanism is transparent.

Synergy Domain VIII: Innovation and Human-Capital Development
Capability transfer is likely to determine whether Agrinas can operationalise assets at the pace implied by its mandate. PalmCo can provide temporary secondments of agronomists, mill engineers, procurement specialists, digital analysts, sustainability professionals, and performance managers. Agrinas can contribute engineers and project-management specialists with experience in infrastructure and construction consultancy. The objective should not be permanent dependence but accelerated learning through structured transfer.

A joint technical academy could standardise competency frameworks in agronomy, milling, safety, maintenance, sustainability, digital tools, project management, and cooperative engagement. Training should be tied to certification and operational outcomes rather than attendance. PalmCo's annual reporting already emphasises human-capital readiness for transformation, while Agrinas' 2025 report documents organisational capability-

building and university partnerships with IPB University and Universitas Indonesia. These relationships create opportunities to connect academic research with operating datasets and demonstration sites.

The innovation system should also distinguish research from deployment. A promising technology should progress through problem definition, laboratory validation, field trial, economic evaluation, social and environmental assessment, demonstration, and scale-up. Ecosystem-orchestration research suggests that hub organisations add value by mobilising complementary knowledge and reducing coordination failures among specialised actors. For PalmCo and Agrinas, the hub function could be applied to universities, equipment suppliers, digital firms, financial institutions, cooperatives, and local governments.

Synergy Domain IX: Financial and Public-Value Optimisation

Financial synergy should begin with avoided duplication. Shared mills, laboratories, procurement frameworks, training facilities, engineering services, digital infrastructure, and selected logistics can reduce the need for parallel state-funded investment. Yet cost saving alone is insufficient. Each project should have a transparent business case showing capital requirement, operating economics, transfer-pricing assumptions, risks, ownership, and the standalone alternative.

Public-value optimisation expands the evaluation beyond corporate returns. Relevant outcomes include farmer income, job quality, domestic value added, affordable cooking-oil availability, renewable-energy substitution, fiscal contributions, technology capabilities, restoration, and reduced emissions. The key is to prevent mission overload by specifying which public objectives are attached to each project. If a project is required to provide below-market output for a policy purpose, the mandate and compensation should be explicit rather than hidden in company accounts.

This finding aligns with SOE literature emphasising the need to reconcile governmental goals with corporate strategy. It also responds to the practical distinction identified by Agrinas in 2026 between the operational surplus from entrusted plantation assets and corporate net profit. The separation is analytically valuable because it prevents state-assignment performance from being conflated with normal corporate earnings.

Table 2 consolidates the nine synergy domains into an implementation-oriented portfolio. Its purpose is to make the review actionable by connecting each domain to a practical orchestration mechanism, an additionality hypothesis, a core KPI family, and the safeguard most likely to determine whether the intervention produces durable public value rather than temporary operational gains.

Table 2: Palm Co-Agrinas Synergy Portfolio, Additionality Logic, and Indicative Performance Measures

Synergy domain	Orchestration mechanism	Additionality hypothesis	Indicative KPIs and safeguard
Plantation stabilisation	Joint estate triage, SOP transfer, technical assistance	Faster production recovery and lower rehabilitation error	Yield/ha, harvesting interval, rehabilitation cost; legality/HCV/HCS gate
Mills & logistics	GIS mill matching, tolling/KSO, joint maintenance	Higher utilisation, lower logistics loss, avoided duplicated capex	Mill utilisation, OER, FFB age, logistics cost; transfer-pricing audit
Downstreaming	Offtake, shared refining, selective co-investment	Higher domestic value added and market reach	Value added/tonne, margin, skilled jobs; market and capex stage gates
Bioenergy & circularity	Standardised POME/biomass projects and replication	Energy substitution, waste reduction, GHG abatement	Energy yield, methane captured, payback; lifecycle assessment
Smallholders & cooperatives	Integrated farmer-service platform	Higher farmer productivity, income and reliable FFB supply	Farmer income, yield, PSR completion; inclusive eligibility and grievance
Digital & traceability	Geospatial registry, shared identifiers, interoperable APIs	Faster decisions, lower information asymmetry, market compliance	Traceable volume, data quality, decision lead time; cyber/data governance
Sustainability	Joint natural-capital and certification protocols	Lower ecological/legal risk and improved legitimacy	GHG intensity, restoration, deforestation exposure; independent assurance
Innovation & human capital	Secondments, joint academy, university/R&D projects	Shorter learning curve and faster technology deployment	Competency certification, pilot-to-scale rate; stage-gated R&D
Finance & public value	Shared services, project finance, explicit mandate costing	Avoided duplication and measurable developmental additionality	NPV/IRR, fiscal value, food/energy outcomes; counterfactual additionality test

Discussion and Analysis

From Bilateral Cooperation to a Dual-Soe Developmental Ecosystem

The thematic findings suggest that PalmCo-Agrinas cooperation should be understood as an emerging developmental ecosystem rather than a conventional bilateral contract. The two firms interact with farmers, cooperatives, ministries, local governments, financial institutions, universities, suppliers, customers, certification organisations, and communities. Their combined influence therefore extends beyond transactions between two corporate balance sheets. The relevant strategic question is whether the pair can coordinate a wider system more effectively than each organisation acting independently.

This perspective changes the meaning of synergy. In a narrow corporate sense, synergy is often expressed as cost saving or revenue enhancement. In a state-owned development context, the concept must also capture public objectives and externalities. The proposed SCOA framework therefore defines four linked stages: complementarity, orchestration, additionality, and safeguarded public value. Complementarity creates potential; orchestration converts potential into coordinated action; additionality tests whether combined action creates incremental value; safeguarded public value ensures that the gains are not achieved by shifting costs to farmers, communities, the environment, or the state.

Figure 3 presents the framework as a sequence with an explicit additionality test. The critical implication is that 'joint outcome' is not enough. A credible counterfactual is required: what would PalmCo have achieved alone, what would Agrinas have achieved alone, and what could have been obtained through competitive market procurement? Coordination costs and risk-adjusted externalities must then be deducted from gross benefits. This approach is consistent with alliance research showing that complementarities can generate value while simultaneously creating interdependence and coordination costs.

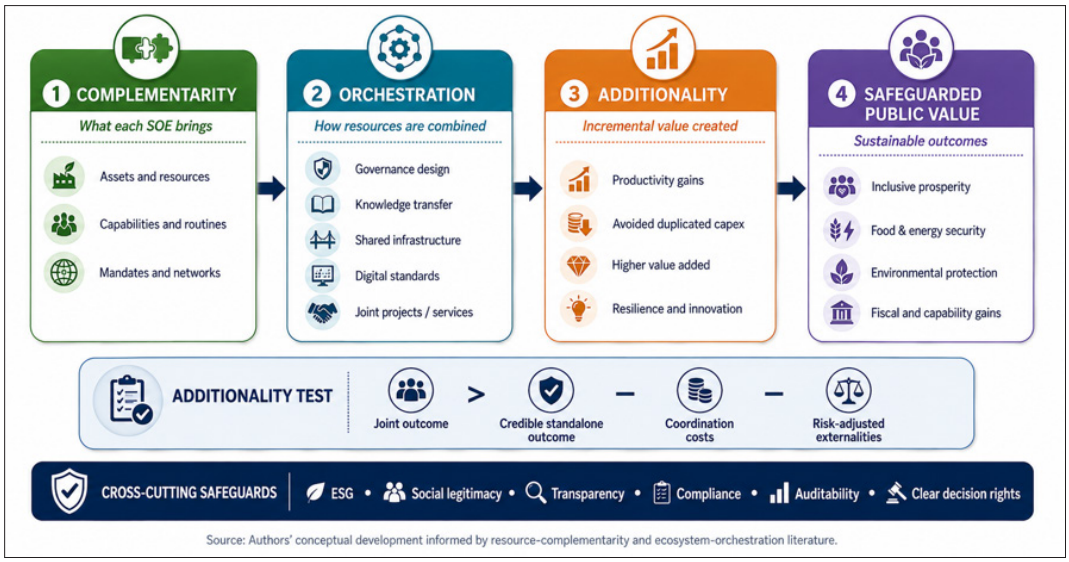

Figure 3: State-Owned Enterprise Complementarity-Orchestration-Additionality (Scoa) Framework

The framework also clarifies that public value is not an excuse to disregard commercial discipline. Persistent financial weakness would eventually undermine the capacity to deliver social or environmental objectives. The stronger interpretation is dual accountability: projects should be commercially viable where commercial returns are expected, and explicitly compensated where they perform a mandated public-service function. This prevents hidden cross-subsidies, improves transparency, and makes trade-offs visible to shareholders and regulators.

Organisational Design: Collaboration Without Unnecessary Consolidation

The analysis does not imply that PalmCo and Agrinas should merge or centralise all operations. Full consolidation can destroy useful role differentiation and create a very large organisation with greater bureaucratic complexity. The literature on alliances and ecosystems suggests that governance should match the nature of the interdependence. Technical assistance can be managed through service-level agreements; shared processing can use transparent tolling or KSO arrangements; digital interoperability can be governed through data standards; downstream ventures may require project companies or joint investment; farmer services may involve cooperatives, banks, and local governments.

A practical governance rule is to use the least complex arrangement capable of capturing the synergy. If an offtake agreement can achieve the same value as a joint venture, the agreement may be preferable. If shared mill processing is temporary while Agrinas stabilises an estate, long-term capital integration may be unnecessary. Conversely, highly asset-specific downstream investments with substantial mutual dependence may justify stronger joint governance. This graduated architecture reduces the tendency to equate synergy with organisational enlargement.

Role clarity is also essential for public accountability. Agrinas should remain responsible for the legality and stewardship of assets entrusted to it unless a formal transfer changes that responsibility. PalmCo should remain accountable for services and assets under its control. Joint projects require clearly allocated liabilities, audit rights, procurement rules, and performance obligations. These safeguards are particularly important because both entities ultimately operate with state capital and public mandates.

A Phased Roadmap: Stabilise, Integrate, then Upgrade

The sequence of synergy matters as much as its content. The evidence supports a three-phase roadmap. Phase I, over approximately 0-18 months, should focus on stabilisation and mapping: legal and ecological triage, crop and infrastructure census, production recovery, urgent maintenance, agronomic SOP transfer, mill matching, baseline traceability, and the establishment of common performance definitions. This phase should prioritise quick operational recovery without locking the companies into premature capital commitments.

Phase II, over approximately 18-36 months, should focus on integration and optimisation. The companies can expand shared logistics and procurement, formalise replanting and farmer-service platforms, establish digital interoperability, optimise mill and maintenance networks, and accelerate certification where preconditions are met. The goal is to convert episodic assistance into repeatable systems. This phase should also generate the data needed for credible investment decisions.

Phase III, over roughly three to five years, should focus on upgrading and diversification: higher-value downstream products, circular bioeconomy, scaled bioenergy, innovation partnerships, and selected international market upgrading. The sequencing protects against a common development-policy failure in which downstream capacity is built before upstream feedstock quality, logistics, governance, and market economics are stable.

Figure 4 combines the roadmap with a performance logic. The integrated scorecard is intentionally multidimensional because a project that improves one metric while undermining others may not be a genuine synergy. The decision rule is that scale-up should occur only after commercial, technical, legal, social, environmental, and additionality stage gates have been passed.

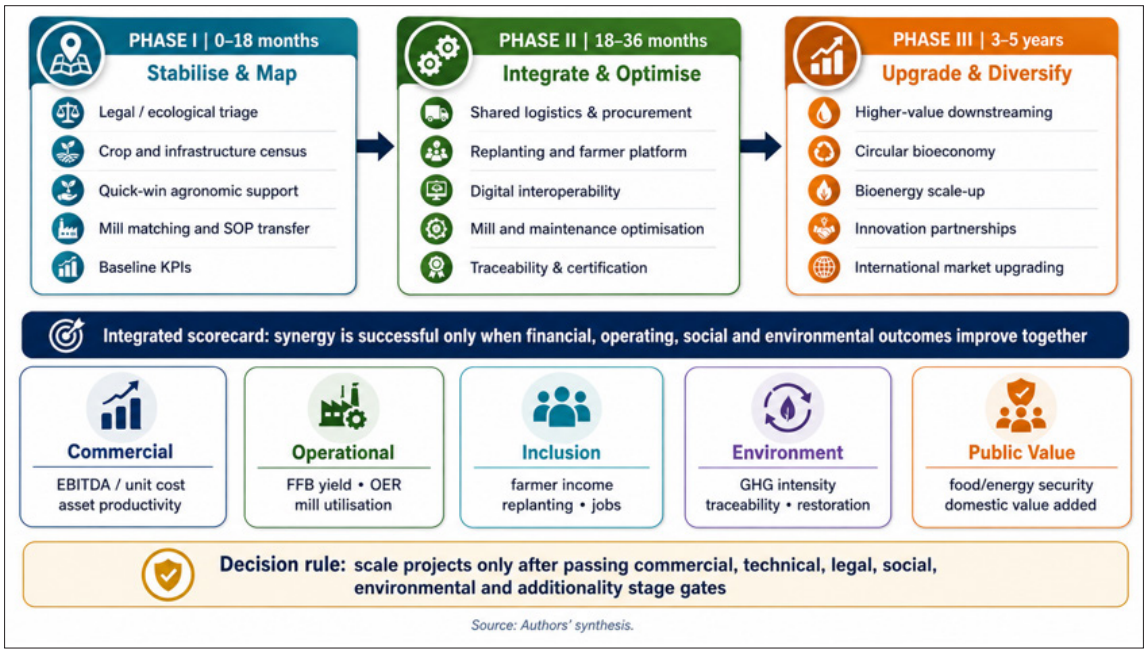

Figure 4: Phased Palm co-agrinas Synergy Roadmap and Integrated Performance Logic

The proposed scorecard contains five dimensions. Commercial indicators include EBITDA, unit cost, and asset productivity. Operational indicators include FFB yield, oil extraction rate, downtime, and mill utilisation. Inclusion indicators include farmer income, replanting completion, employment, and cooperative participation. Environmental indicators include greenhouse-gas intensity, traceability, restoration, and deforestation exposure. Public-value indicators include domestic value added, food and energy security contributions, fiscal value, and capability development. This scorecard converts broad public mandates into observable outcomes.

Governance Architecture and the Role of the Shareholder

A joint strategic steering mechanism is necessary but should not become a parallel bureaucracy. Its function should be to establish synergy priorities, approve common standards, resolve cross-company bottlenecks, and report additionality to the shareholder. Day-to-day project management should remain with accountable project owners. A small synergy Project Management Office could maintain the portfolio, stage gates, risk register, and KPI definitions.

Within Indonesia's evolving state-ownership framework, the shareholder has a particularly important role in preventing duplication and ensuring that inter-SOE cooperation generates additional rather than merely transferred value. Capital approval should require disclosure of whether existing state-owned capacity can be used before new capacity is built. This is especially relevant to mills, refineries, digital platforms, laboratories, training centres, logistics, and engineering services. The purpose is not to force all business toward other SOEs, which could reduce competition and efficiency, but to ensure that state capital is allocated with knowledge of available public assets and credible private alternatives.

Transparent transfer pricing is central. Services between PalmCo and Agrinas should be benchmarked, documented, and auditable. Where a transaction serves a non-commercial public mandate, the subsidy or compensation should be explicit. This avoids the risk that inter-SOE transactions are used to move profits, conceal inefficiencies, or blur accountability. Good governance is therefore part of the synergy mechanism rather than an administrative layer added afterward, and recent evidence on SOE accountability reinforces the value of clearly assigned responsibility, stronger internal controls, and auditable investment decisions.

Agrinas' own 2025 governance assessment reported an ACGS score of 88.96, categorised as 'Good', while both companies have been strengthening risk-management and digital-governance structures. These foundations are useful but not sufficient for the scale of interdependence envisioned. Joint-project governance requires a specific rulebook for conflicts of interest, procurement,

data rights, audit access, environmental responsibility, community grievance, and project termination.

Smallholder and Cooperative Additionality as a Strategic Test

A particularly demanding test of public value is whether cooperation improves the position of farmers rather than merely securing raw material for SOE mills. The evidence reviewed earlier suggests that farmer outcomes depend on bundled services and institutional capacity. A PalmCo-Agrinas platform can generate additionality if it reduces the cost and complexity of accessing replanting finance, high-quality seedlings, agronomic advice, traceability, certification, and reliable offtake. It would generate little additionality if farmers simply shift from one buyer to another without productivity or income gains.

Measurement should therefore include farmer-level baselines and follow-up. Yield per hectare, net income, price received relative to benchmark, harvesting interval, replanting survival, loan performance, certification progress, and grievance resolution can be monitored at cohort level. Participation should also be disaggregated where feasible by farm type, cooperative, gender, and legal status. This would allow the companies to learn which service bundles work for which farmers, consistent with the literature's repeated finding that smallholders are heterogeneous.

The cooperative strategy announced by Agrinas in 2026 creates a timely institutional vehicle. Yet cooperatives should not be treated as automatically effective. Governance quality, management capability, member participation, financial controls, and bargaining power vary widely. PalmCo's commercial systems and Agrinas' cooperative network should therefore be connected through transparent contracts and capacity-building rather than administrative assignment alone.

Sustainability Additionality and the Legitimacy of Asset Recovery

Agrinas' mandate gives the partnership an unusual environmental and legal dimension. Some entrusted assets originate from state enforcement and recovery processes. The legitimacy of future operation therefore depends on demonstrating that state management improves governance relative to the problematic baseline. This creates an opportunity for environmental additionality: clearer boundaries, reduced illegal expansion, restoration of sensitive areas, improved peat management, transparent community arrangements, and traceable production.

The partnership should establish a 'no automatic grandfathering' principle. Existing plantings or infrastructure should not be assumed compliant simply because they have been transferred to a state enterprise. Each site should undergo legality and environmental due diligence. Where restoration or conservation is required, the associated land should be treated as a managed natural-capital asset rather than an unproductive residual category. This would align operational decisions with evidence that biodiversity and climate outcomes depend on landscape configuration and ecosystem safeguards.

This approach can also strengthen market competitiveness. Global buyers increasingly require traceability and deforestation-risk information. A state-owned platform capable of documenting the legal and ecological status of recovered assets could create reputational value and lower future compliance costs. However, that benefit depends on credible third-party verification and transparent disclosure rather than internal assurance alone.

Theoretical Implications

The PalmCo-Agrinas case extends resource-complementarity theory in three ways. First, the relevant resources include mandates and public networks, not only commercial assets and capabilities. A state mandate to recover and manage land is itself a strategic resource, but it is valuable only when combined with operating capability. Second, additionality includes public value as well as firm-level performance. Third, safeguards are endogenous to value creation because environmental or social failure can destroy legitimacy, market access, and long-term asset value.

The case also extends ecosystem-orchestration logic. In private ecosystems, orchestration often focuses on innovation and market value. In state-owned agribusiness, orchestration must also handle land legality, public procurement, social conflict, smallholder development, policy assignments, and environmental obligations. The orchestrator therefore requires not only coordination capability but also constitutional legitimacy, auditability, and transparent decision rights.

Finally, the SCOA framework offers a more demanding interpretation of synergy. Strategic plans frequently label joint programmes as synergies before outcomes are observed. SCOA instead requires a counterfactual and net-benefit logic. A project creates synergy only when the joint outcome exceeds a credible standalone alternative after coordination costs and risk-adjusted externalities are considered. This definition is particularly appropriate for public capital because it reduces the risk that organisational scale or political visibility substitutes for economic and developmental performance.

Policy Implications

The first policy implication is that Indonesia should treat PalmCo and Agrinas as differentiated components of a broader state-owned palm oil architecture rather than require both to build identical capabilities. PalmCo can serve as a mature operating and capability platform in selected domains, while Agrinas can specialise in asset recovery, rehabilitation, and development of entrusted assets, supported by its engineering heritage and cooperative networks. Over time, the boundary may evolve, but duplication should be justified rather than assumed.

Second, shareholder governance should require a formal PalmCo-Agrinas Synergy Blueprint with a limited number of measurable projects rather than a long list of cooperation themes. Each project should identify the counterfactual, additionality mechanism, responsible entity, capital requirement, transfer-pricing method, key risks, safeguards, and KPI. The blueprint should be reviewed annually and projects that fail stage gates should be redesigned or terminated.

Third, public policy should crowd in rather than crowd out farmers, cooperatives, local businesses, banks, universities, and competitive suppliers. The purpose of two large SOEs should not be to create a closed state-owned value chain. Their scale can instead reduce coordination failures, establish standards, create bankable pipelines, and provide transparent market access for other actors. This is particularly important for smallholder replanting, traceability, bioenergy, and local infrastructure.

Fourth, food- and energy-security assignments should be explicit. If PalmCo and Agrinas are expected to supply strategic products such as affordable cooking oil or renewable fuels under policy constraints, the government should define service obligations

and compensation transparently. Hidden policy costs can weaken corporate balance sheets and make it difficult to distinguish managerial performance from public assignments.

Conclusion and Recommendations

This qualitative literature review finds a strong strategic rationale for deeper PalmCo-Agrinas cooperation, but it rejects the assumption that larger combined asset scale is itself a source of value. The most important complementarity lies in the interaction between PalmCo's established operating, processing, digital, commercial, sustainability, and farmer-partnership capabilities and Agrinas' expanding state-entrusted asset base, rehabilitation mandate, engineering capability, and emerging cooperative and public-policy networks. Their formal cooperation since February 2025 and subsequent downstream engagement provide an empirical foundation for moving from episodic assistance toward a more systematic inter-SOE architecture.

The highest-probability near-term synergies are operational rather than spectacular: estate triage, agronomic stabilisation, mill matching, logistics, maintenance, digital asset mapping, shared standards, human-capital secondment, and farmer-service integration. These activities can create value quickly by reducing avoidable crop losses, shortening learning curves, improving mill utilisation, and avoiding premature duplication of capital expenditure. Downstreaming, bioenergy, and circular-bioeconomy investments may generate larger long-run value, but they should follow rather than precede stable feedstock, legality, traceability, operational data, and market economics.

The paper's central conceptual contribution is the SCOA framework. Complementarity identifies what each SOE brings. Orchestration specifies how resources are combined. Additionality tests whether cooperation creates value beyond credible standalone alternatives. Safeguarded public value ensures that economic gains are not achieved by shifting costs to communities, farmers, the environment, or the state. This framework is intended to make synergy auditable and therefore more useful for public-sector governance.

Several policy recommendations follow. First, the shareholder should establish a formal multi-year PalmCo-Agrinas Synergy Blueprint with explicit project-level ownership and stage gates. Second, Agrinas' entrusted assets should be classified before investment into productive rehabilitation, replanting, restoration, infrastructure, social-use, and no-go categories. Third, shared processing and existing state-owned capacity should be evaluated before new mills or downstream facilities are approved. Fourth, a unified smallholder and cooperative service platform should combine replanting, agronomy, finance, offtake, traceability, certification, and grievance mechanisms. Fifth, digital interoperability should begin with a geospatial state-asset registry and common definitions rather than a single monolithic IT system. Sixth, all joint transactions should use transparent transfer pricing, audit rights, and clear liability allocation.

For management, an 18-month quick-win portfolio is recommended. The portfolio should include a joint estate census, mill-catchment mapping, agronomic secondments, urgent infrastructure rehabilitation, baseline traceability, a common risk taxonomy, and the first farmer-service pilots. A small synergy PMO can coordinate the portfolio while operational accountability remains with each project owner. Human-capital transfer should be designed to create Agrinas capability rather than long-term dependence on PalmCo.

For sustainability, the partnership should adopt a no-automatic-grandfathering principle for recovered assets. Previous land use or existing planting should not be assumed compliant. Legal, HCV/HCS, peat, riparian, biodiversity, and social due diligence should precede production targets. Restoration and conservation should be treated as managed assets with measurable outcomes. This approach would strengthen both legitimacy and future market access.

The study has limitations. It is a qualitative review and cannot establish causal impact from PalmCo-Agrinas cooperation. Agrinas is also changing rapidly, so land and operational figures require explicit dating and careful distinction between entrusted, managed, planted, mature, and financially recognised assets. Future research should therefore evaluate estate-level performance before and after technical assistance, compare shared-processing arrangements with standalone alternatives, assess farmer outcomes longitudinally, and quantify lifecycle and natural-capital effects of downstream and bioenergy projects.

The broader conclusion is that the PalmCo-Agrinas relationship can become more than a coordination mechanism between two SOEs. If governed through differentiated roles, transparent contracts, shared information, disciplined capital allocation, social inclusion, and environmental safeguards, it can function as a state-owned development platform for transforming Indonesia's palm oil economy from parallel assets into an integrated system of productive capability. The strategic objective should not be to make the state own more of the value chain, but to make state-owned capabilities generate demonstrably more value - economically, socially, environmentally, and institutionally - than fragmented action could achieve.

References

1. Qaim M, Sibhatu KT, Siregar H, Grass I (2020) Environmental, economic, and social consequences of the oil palm boom. Annual Review of Resource Economics 12: 321-344.
2. Meijaard E, Brooks TM, Carlson KM (2020) The environmental impacts of palm oil in context. Nature Plants 6: 1418-1426.
3. Purnomo H, Okarda B, Dermawan A, Ilham QP, Pacheco P, et al. (2020) Reconciling oil palm economic development and environmental conservation in Indonesia: A value chain dynamic approach. Forest Policy and Economics 111: 102089.
4. Murphy DJ, Goggin K, Paterson RRM (2021) Oil palm in the 2020s and beyond: Challenges and solutions. CABI Agriculture and Bioscience 2: 39.
5. Monzon JP, Slingerland MA, Rahutomo S (2021) Fostering a climate-smart intensification for oil palm. Nature Sustainability 4: 595-601.
6. Lim YL, Woittiez LS, Kurniawan S (2023) Too little, too imbalanced: Nutrient supply in smallholder oil palm fields in Indonesia. Agricultural Systems 210: 103729.
7. Zhao J, Elmore AJ, Lee JSH, Numata I, Zhang X, Cochrane MA (2023) Replanting and yield increase strategies for alleviating the potential decline in palm oil production in Indonesia. Agricultural Systems 210: 103714.
8. Petri H, Hendrawan D, Bahr T, Musshoff O, Wollni M, et al. (2024) Replanting challenges among Indonesian oil palm smallholders: A narrative review. Environment, Development and Sustainability 26: 19351-19367.
9. Woittiez LS, Slingerland M, van Noordwijk M, Silalahi AJ, van Heerwaarden J, Giller KE (2024) People, palms, and productivity: Testing better management practices in

Indonesian smallholder oil palm plantations. Agriculture 14: 1626.
10. Grass I, Loos J, Baensch S (2020) Trade-offs between multifunctionality and profit in tropical smallholder landscapes. Nature Communications 11: 1186.
11. Swails E, Hergoualc'h K, Verchot L, Novita N, Lawrence D (2021) Spatio-temporal variability of peat CH4 and N2O fluxes and their contribution to peat GHG budgets in Indonesian forests and oil palm plantations. Frontiers in Environmental Science 9: 617828.
12. Deere NJ, Guillera-Arroita G, Swinfield T (2022) Riparian buffers can help mitigate biodiversity declines in oil palm agriculture. Frontiers in Ecology and the Environment 20: 459-466.
13. Xu Y, Yu L, Ciais P, Li W, Santoro M, Yang H, Gong P (2022) Recent expansion of oil palm plantations into carbon-rich forests. Nature Sustainability 5: 574-577.
14. Fleiss S, Buchanan GM, Sanderson FJ (2023) Implications of zero-deforestation palm oil for tropical grassy and dry forest biodiversity. Nature Ecology & Evolution 7: 250-263.
15. Zemp DC, Guerrero-Ramirez N, Brambach F (2023) Tree islands enhance biodiversity and functioning in oil palm landscapes. Nature 618: 316-321.
16. Watts JD, Tacconi L, Irawan S, Wijaya AH (2021) Challenges faced by smallholders in achieving sustainable palm oil certification in Indonesia. World Development 146: 105565.
17. Ogahara Z, Jespersen K, Theilade I, Nielsen MR (2022) Review of smallholder palm oil sustainability reveals limited positive impacts and identifies key implementation and knowledge gaps. Land Use Policy 120: 106258.
18. de Vos RE, Suwarno A, Slingerland M, van der Meer PJ, Lucey JM (2023a) pre-certification conditions of independent oil palm smallholders in Indonesia: Assessing prospects for RSPO certification. Land Use Policy 130: 106660.
19. Renner S, Ruml A, Lakemann T, Nuryartono N, Tjoa A, et al. (2024) Smallholder RSPO certification, economic benefits and agrochemical use. Environmental Research Letters 19: 114093.
20. Ekaputri AD, Gaveau DLA, Heilmayr R, Carlson KM (2025) Uneven participation of independent and contract smallholders in certified palm oil mill markets in Indonesia. Communications Earth & Environment 6.
21. Mehraban N, Kubitza C, Alamsyah Z, Qaim M (2021) Oil palm cultivation, household welfare, and exposure to economic risk in the Indonesian small farm sector. Journal of Agricultural Economics 72: 901-915.
22. Hendrawan D, Chrisendo D, Musshoff O (2024) Strengthening oil palm smallholder farmers' resilience to future industrial challenges. Scientific Reports 14: 12105.
23. Witjaksono J, Djaenudin D, Fery Purba S, Yulianti A, Fadwiwati AY, Muslimin, Sitompul RF, Azahari DH, Imran, Purba R, Seerasarn N (2024) Corporate farming model for sustainable supply chain crude palm oil of independent smallholder farmers. Frontiers in Sustainable Food Systems 8: 1418732.
24. Rygh A, Benito GRG (2022) Governmental goals and the international strategies of state-owned multinational enterprises: A conceptual discussion. Journal of Management and Governance 26: 1155-1181.
25. Panibratov A, Klishevich D (2023) Emerging market state-owned multinationals: A review and implications for the state capitalism debate. Asian Business & Management 22: 84-117.
26. Kim K, Sumner A (2021) Bringing state-owned entities back into the industrial policy debate: The case of Indonesia. Structural Change and Economic Dynamics 59: 496-509.
27. Cardinale R, Landoni M, Mi Z (2024) Global state-owned enterprises in the 21st century: Rethinking their contribution to structural change, innovation, and public policy. Structural Change and Economic Dynamics 68: 468-472.
28. PTPN IV (2025a) Annual Report 2024: Value Innovation for Impactful and Resilient Agribusiness. Jakarta: PT Perkebunan Nusantara IV. Available at: https://www.ptpn4.co.id/pdf/annual-report/Annual%20Report%202024.pdf
29. Agrinas Palma Nusantara (2026a) Annual Report 2025: Sustainable Transformation Towards National Food and Energy Independence. Jakarta: PT Agrinas Palma Nusantara (Persero).
30. Agrinas Palma Nusantara (2026b) Agrinas Palma Nusantara Terima Tambahan 2,37 Juta Hektare Lahan Negara. 13 May. Available at: https://agrinaspalma.co.id/news/agrinas-palma-nusantara-terima-tambahan-237-juta-hektare-lahan-negara.
31. Agrinas Palma Nusantara (2026c) PT Agrinas Palma Nusantara (Persero) Bukukan Surplus Operasional Pengelolaan Aset Perkebunan Rp2,86 Triliun pada 2025. 9 July. Available at: https://agrinaspalma.co.id/news/pt-agrinas-palma-nusantara-persero-bukukan-surplus-operasional-pengelolaan-aset-perkebunan-rp2-86-triliun-pada-2025.
32. PTPN IV (2025b) PalmCo dan Agrinas Perkuat Produksi Minyakita untuk Ketahanan Pangan Nasional. 4 October. Available at: https://www.ptpn4.co.id/id/news/palmco-dan-agrinas-perkuat-produksi-minyakita-untuk-ketahanan-pangan-nasional-1759886734.
33. Jin JL, Wang L (2021) Resource complementarity, partner differences, and international joint venture performance. Journal of Business Research 130: 232-246.
34. Agarwal S, Kapoor R (2023) Value creation tradeoff in business ecosystems: Leveraging complementarities while managing interdependencies. Organization Science 34: 1216-1242.
35. Shen L, Shi Q, Parida V, Jovanovic M (2024) Ecosystem orchestration practices for industrial firms: A qualitative meta-analysis, framework development and research agenda. Journal of Business Research 173: 114463.
36. de Vos RE, Slingerland M, Woittiez LS, van der Meer PJ (2023b) Shortening harvest interval, reaping benefits? A study on harvest practices in oil palm smallholder farming systems in Indonesia. Agricultural Systems 211: 103753.
37. Rosyadi FH, Mulyo JH, Perwitasari H, Darwanto DH (2021) Export intensity and competitiveness of Indonesia's crude palm oil to main destination countries. Agricultural Economics - Czech 67: 189-199.
38. Husin S, Wijaya C, Ghafur AHS, Machmud TMZ, Mardanugraha E (2023) Trade policies support for palm oil downstreaming in Indonesia. JEJAK: Journal of Economics and Policy 16: 302-322.
39. Kaniapan S, Hassan S, Ya H, Nesan KP, Azeem M (2021) The utilisation of palm oil and oil palm residues and the related challenges as a sustainable alternative in biofuel, bioenergy, and transportation sector: A review. Sustainability 13: 3110.
40. Farobie O, Hartulistiyoso E (2022) Palm oil biodiesel as a renewable energy resource in Indonesia: Current status and challenges. BioEnergy Research 15: 93-111.
41. Wahyono Y, Hadiyanto, Gheewala SH (2023) Evaluating the environmental impacts at the end point level of the biodiesel production process from multiple feedstocks in Indonesia through life cycle assessment methodology. Waste and Biomass Valorization 14: 3115-3131.
42. Prananta W, Kubiszewski I (2021) Assessment of Indonesia's future renewable energy plan: A meta-analysis of biofuel energy return on investment (EROI). Energies 14: 2803.

43. Siregar AA, Halimatussadiah A, Moeis FR, Anky WAK, Nainggolan D (2024) The oil palm replanting imperative: Are smallholder farmers willing to participate? Forest Policy and Economics 169: 103362.
44. Pashkevich MD, Aryawan AAK, Luke SH (2022) Riparian buffers made of mature oil palms have inconsistent impacts on oil palm ecosystems. Ecological Applications 32: 2552.
45. Dalheimer B, Parikoglou I, Brambach F, Yanita M, Kreft H, Brummer B (2024) On the palm oil-biodiversity trade-off: Environmental performance of smallholder producers. Journal of Environmental Economics and Management 125: 102975.
46. Purwanto E, Santoso H, Jelsma I, Widayati A, Nugroho HYSH, et al. (2020) Agroforestry as policy option for forest-zone oil palm production in Indonesia. Land 9: 531.
47. Fosch A, Zaehringer JG, Jabbar A (2023) Replanting unproductive palm oil with smallholder plantations can help achieve Sustainable Development Goals in Sumatra, Indonesia. Communications Earth & Environment 4: 378.
48. Brandi C (2021) The interaction of private and public governance: The case of sustainability standards for palm oil. The European Journal of Development Research 33: 1574-1595.
49. Choiruzzad SAB, Tyson A, Varkkey H (2021) The ambiguities of Indonesian Sustainable Palm Oil certification: Internal incoherence, governance rescaling and state transformation. Asia Europe Journal 19: 189-208.
50. Putri EIK, Dharmawan AH, Hospes O (2022) The oil palm governance: Challenges of sustainability policy in Indonesia. Sustainability 14: 1820.
51. Denashurya NI, Nurliza, Dolorosa E, Kurniati D, Suswati D (2023) Overcoming barriers to ISPO certification: Analyzing the drivers of sustainable agricultural adoption among farmers. Sustainability 15: 16507.
52. Rafik Walen S, Carlson KM (2024) Smallholder participation in zero-deforestation supply chain initiatives in the Indonesian palm oil sector: Challenges, opportunities, and limitations. Elementa: Science of the Anthropocene 12: 00099.
53. Hafiz N, Azmi KM, Nimfa DT, Latiff ASA, Wahab SA (2022) COVID-19 and its implications to the assessment of sustainable palm oil supply chain management: An Indonesian perspective. Frontiers in Sustainability 2: 738985.
54. Santika T, Wilson KA, Law EA (2021) Impact of palm oil sustainability certification on village well-being and poverty in Indonesia. Nature Sustainability 4: 109-119.
55. Rowland D, Zanello G, Waliyo E, Ickowitz A (2022) Oil palm and gendered time use: A mixed-methods case study from West Kalimantan, Indonesia. Forest Policy and Economics 137: 102682.
56. Li TM (2024) Securing oil palm smallholder livelihoods without more deforestation in Indonesia. Nature Sustainability 7: 387-393.
57. Supriatna J, Djumarno, Saluy AB, Kurniawan D (2024) Sustainability analysis of smallholder oil palm plantations in several provinces in Indonesia. Sustainability 16: 4383.
58. Wong YB, Gibbins C, Azhar B, Phan SS, Scholefield P, Azmi R, Lechner AM (2023) Smallholder oil palm plantation sustainability assessment using multi-criteria analysis and unmanned aerial vehicles. Environmental Monitoring and Assessment 195: 577.
59. Kavadis N, Thomsen S (2023) Sustainable corporate governance: A review of research on long-term corporate ownership and sustainability. Corporate Governance: An International Review 31: 198-226.
60. Wu Y, Chen W, Yan H (2024) The accountability system for operation and investment and audit quality of state-owned enterprises. International Review of Financial Analysis 96: 103680.
61. Lun M, Fu Y, Chen W, Liu Z (2025) The accountability system for operation and investment and the sustainable development of state-owned enterprises: Evidence from ESG performance. Finance Research Letters 85: 108162.
62. Trisyulianti E, Prihartono B, Andriani M, Suryadi K (2022) Sustainability performance management framework for circular economy implementation in state-owned plantation enterprises. Sustainability 14: 482.
63. Di Dio F, Correani L (2020) Quality-improving and cost-reducing strategic alliances. Economia Politica 37: 493-524.
64. Kumar M, Pullman M, Bouzdine-Chameeva T, Rodrigues VS (2022) The role of the hub-firm in developing innovation capabilities: Considering the French wine industry cluster from a resource orchestration lens. International Journal of Operations & Production Management 42: 526-551.
65. Cui Z, Han Y (2022) Resource orchestration in the ecosystem strategy for sustainability. Sustainable Computing: Informatics and Systems 36: 100796.
66. Jovanovic M, Sjodin D, Parida V (2022) Co-evolution of platform architecture, platform services, and platform governance: Expanding the platform value of industrial digital platforms. Technovation 118: 102218.
67. Wilson SM, Anagnostopoulos D (2021) Methodological guidance paper: The craft of conducting a qualitative review. Review of Educational Research 9: 651-670.
68. Dhollande S, Taylor A, Meyer S, Scott M (2021) Conducting integrative reviews: A guide for novice nursing researchers. Journal of Research in Nursing 26: 427-438.
69. Barry ES, Merkebu J, Varpio L (2022) State-of-the-art literature review methodology: A six-step approach for knowledge synthesis. Perspectives on Medical Education 11: 281-288.
70. Kraus S, Breier M, Lim WM (2022) Literature reviews as independent studies: Guidelines for academic practice. Review of Managerial Science 16: 2577-2595.
71. Grisanto RGS, Wiryono SK, Sunitiyoso Y (2025) Key drivers for successful integration of Indonesian State-Owned Holding: a Soft Systems Methodology approach. Cogent Business & Management 12: 2483378.
72. Nabila R, Hidayat W, Haryanto A, Hasanudin U, Iryani DA, et al. (2023) Oil palm biomass in Indonesia: Thermochemical upgrading and its utilization. Renewable and Sustainable Energy Reviews 176: 113193.
73. Goh KC, Kurniawan TA, AlSultan GA (2025) Innovative circular bioeconomy and decarbonization approaches in palm oil waste management: A review. Process Safety and Environmental Protection 195: 106746.
74. Agrinas Palma Nusantara (2026d) PT Agrinas Palma Nusantara (Persero) dan Kementerian Koperasi Perkuat Kemitraan Koperasi Sawit untuk Dukung Ketahanan Pangan dan Energi Nasional. 2 July. Available at: https://agrinaspalma.co.id/news/pt-agrinas-palma-nusantara-persero-dan-kementerian-koperasi-perkuat-kemitraan-koperasi-sawit-untuk-dukung-ketahanan-pangan-dan-energi-nasional.