

Artificial Intelligence and Green Public Procurement: Accelerating Energy Transition in ASEAN Economies

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Introduction

ASEAN economies face escalating climate risks, rising energy demand, and infrastructure gaps. Public procurement represents 15–25% of GDP across ASEAN and offers a powerful policy lever for sustainable development. However, existing procurement is often cost-driven with limited integration of climate, carbon, and sustainability considerations, resulting in inefficient resource use, higher lifecycle carbon emissions, and missed opportunities for innovation. Emerging technologies—especially Artificial Intelligence (AI), big data analytics, and blockchain—create new opportunities to transform procurement into a strategic tool for climate action and energy transition. This study explores the potential of AI-enabled Green Public Procurement (AI-GPP) to enhance decision quality, promote green investment, improve transparency and accountability, and accelerate the transition toward a low-carbon, climate-resilient, and inclusive ASEAN.

KEY STATISTICS FOR ASEAN



RESEARCH BACKGROUND

Procurement can drive industrial transformation, green innovation, and climate resilience when digital intelligence and environmental criteria are integrated into decision-making. AI-GPP has the potential to improve value for money, reduce lifecycle emissions, enhance governance, and support the region's energy transition and net-zero commitments.

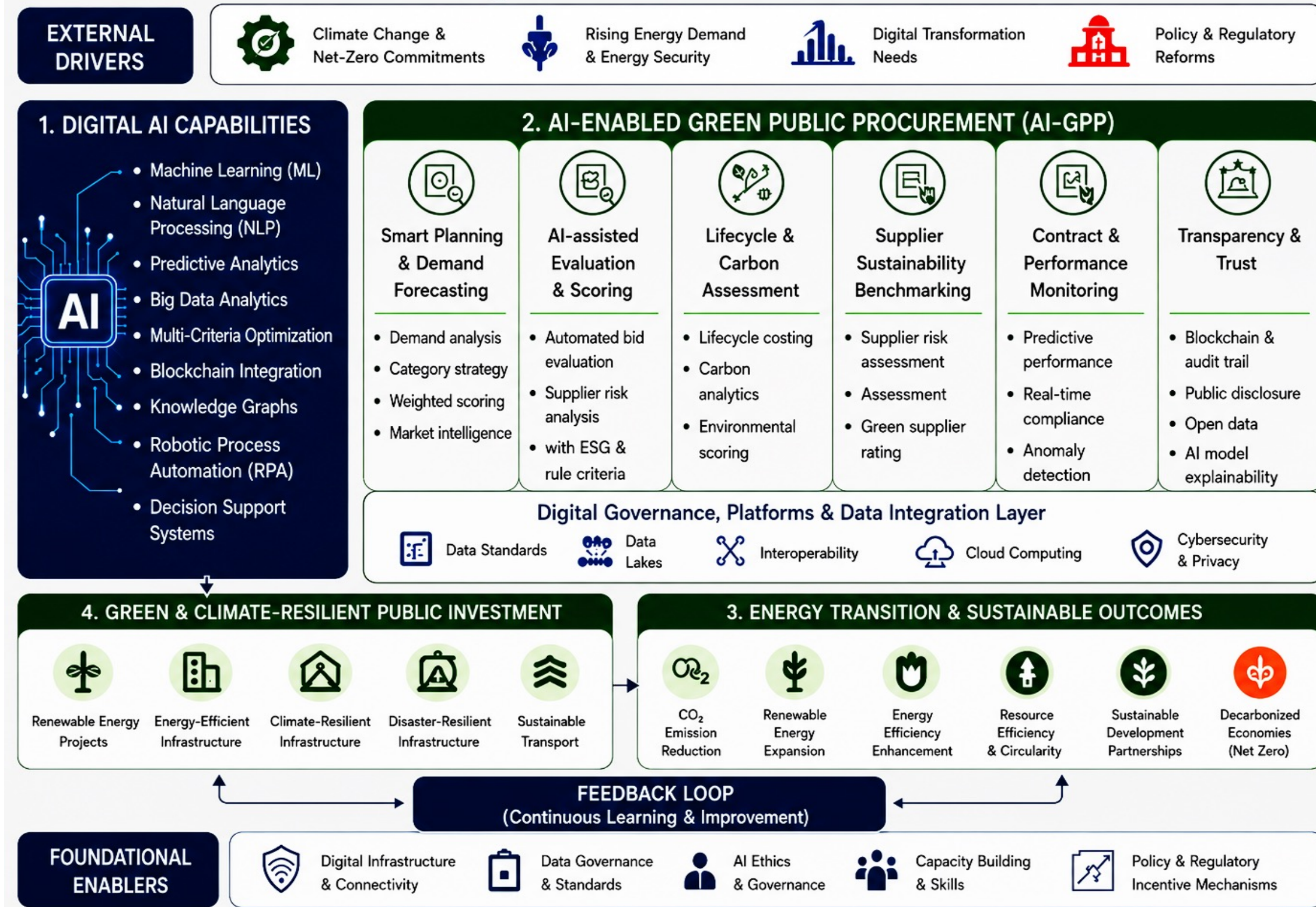
RESEARCH OBJECTIVES

- To investigate the potential of AI-enabled Green Public Procurement (AI-GPP) in supporting climate-resilient infrastructure and energy transition in ASEAN.
- To identify key technologies, governance mechanisms, and enabling factors that strengthen the effectiveness of AI-GPP.
- To propose policy recommendations and an integrated framework for scalable implementation of AI-GPP across ASEAN economies.



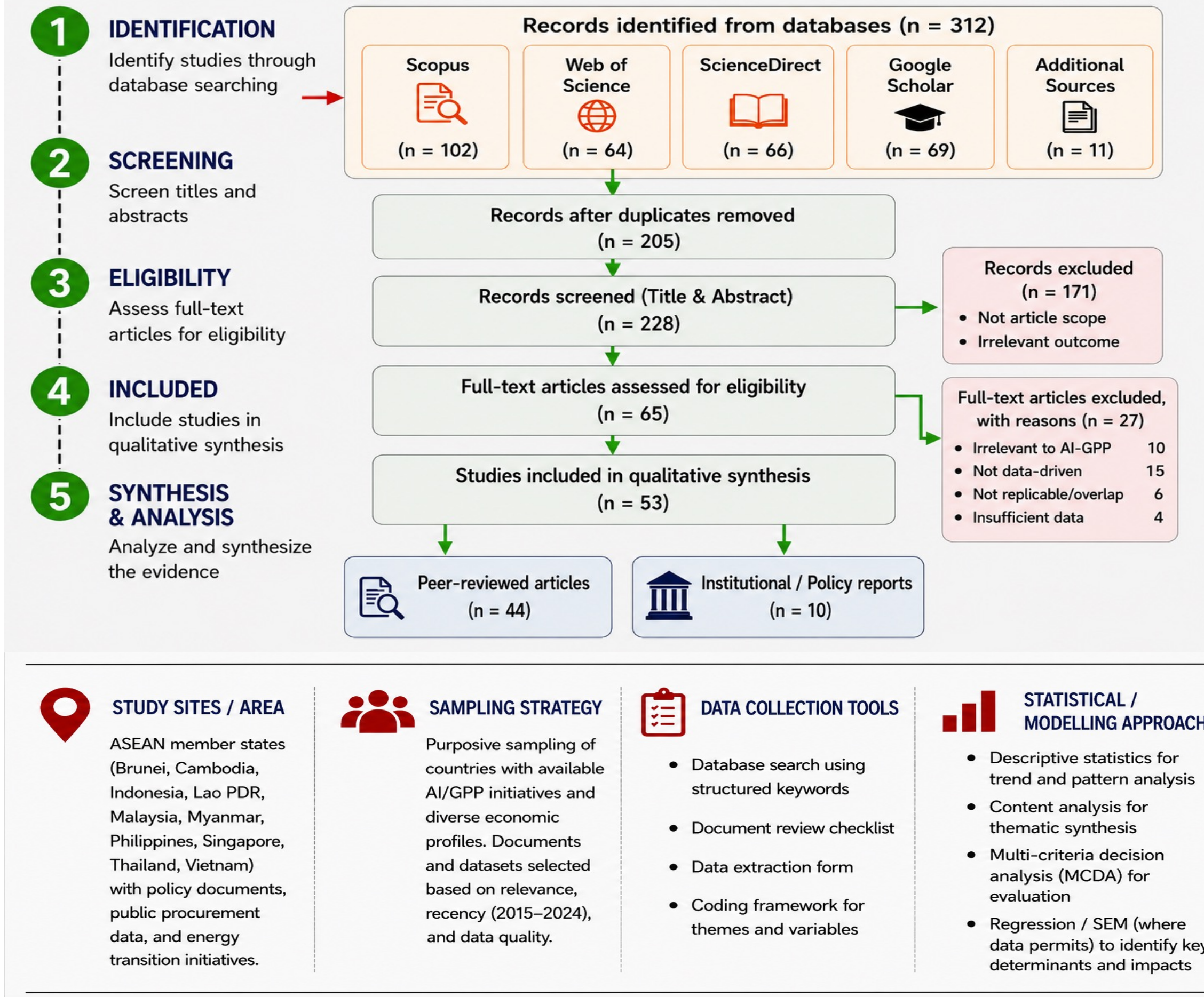
Methodology

Figure 1. Research Framework



Systematic Literature Review (PRISMA 2020)

Figure 2. PRISMA-Based Research Process

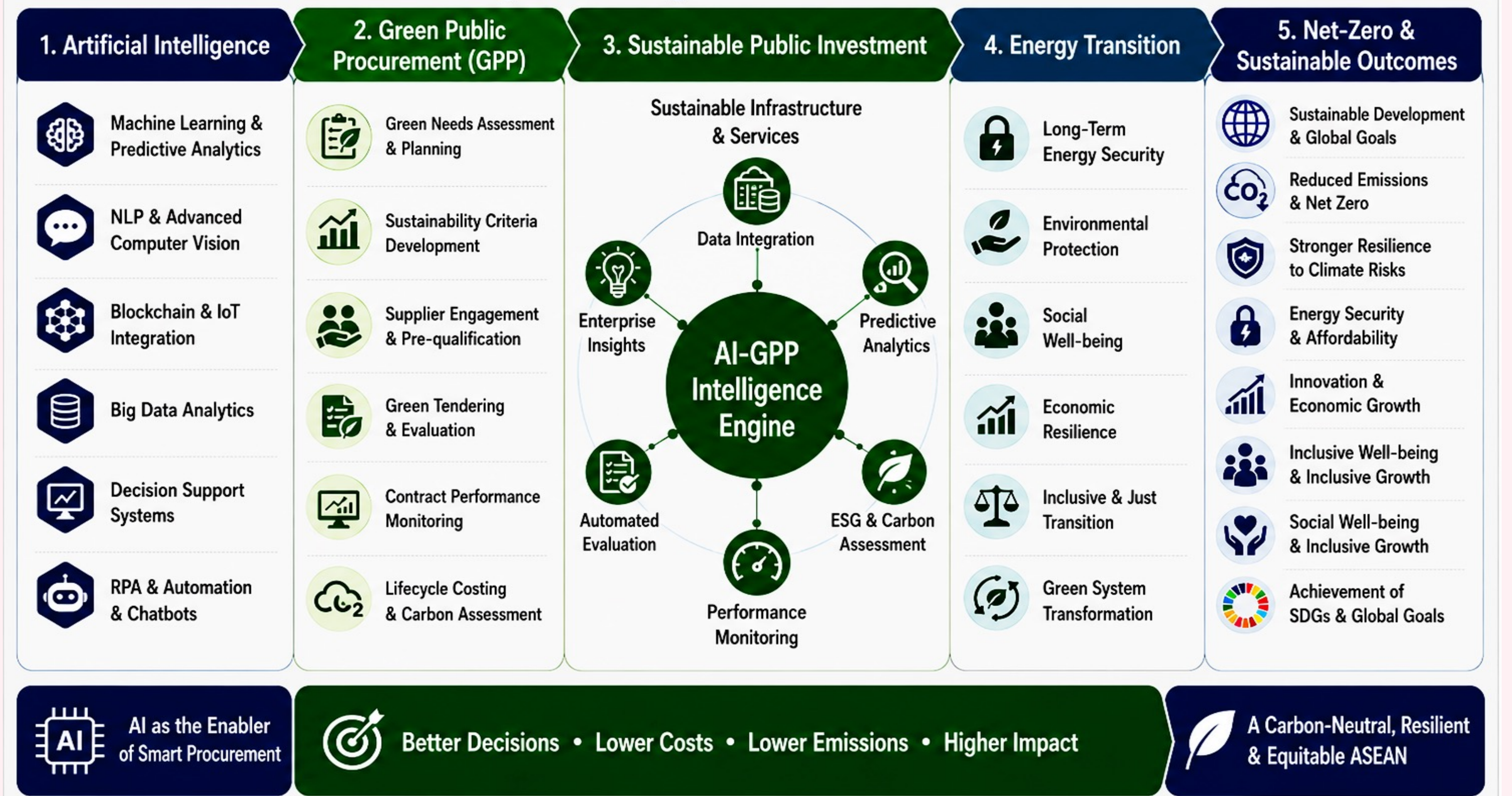


References / Footnotes

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Results

Figure 3. Integrated AI-GPP Framework



Key Findings

- The PRISMA-based systematic literature review identified 312 records, of which 58 eligible studies (44 peer-reviewed articles and 14 institutional or policy reports) were retained after screening and quality assessment. These publications provided a comprehensive evidence base for examining the role of Artificial Intelligence in Green Public Procurement (AI-GPP) and sustainable energy transition in ASEAN.
- Five major research themes consistently emerged across the literature: (1) AI-enabled procurement automation and decision support, (2) lifecycle costing and carbon assessment, (3) supplier sustainability evaluation and ESG integration, (4) digital governance, transparency, and accountability, and (5) renewable energy transition and climate-resilient public investment. Together, these themes demonstrate that AI technologies can substantially enhance procurement effectiveness while supporting environmental objectives.
- As shown in Figure 3 (above), the proposed Integrated AI-GPP Framework combines predictive analytics, machine learning, automated evaluation, lifecycle carbon assessment, supplier benchmarking, and real-time performance monitoring into a unified procurement system. This integration enables evidence-based decision-making, improves procurement transparency, reduces operational inefficiencies, and promotes value for money while incorporating sustainability criteria throughout the procurement lifecycle.
- The findings further indicate that digital governance mechanisms, including standardised data architectures, interoperable platforms, blockchain-supported transparency, and continuous performance monitoring, strengthen institutional accountability and facilitate the adoption of sustainable procurement practices across public agencies.
- As illustrated in Figure 4 (below), AI-enabled Green Public Procurement establishes a policy pathway linking intelligent procurement decisions to climate-resilient infrastructure investment, renewable energy deployment, enhanced governance quality, and long-term energy security. The framework demonstrates how AI can transform procurement from an administrative process into a strategic instrument for national development and decarbonization.
- Overall, the proposed AI-GPP framework suggests that integrating digital intelligence into public procurement can improve procurement efficiency, reduce lifecycle carbon emissions, optimise resource allocation, support evidence-based policymaking, and accelerate ASEAN's transition toward low-carbon, climate-resilient, and net-zero economies. The framework also contributes to the broader Sustainable Development Goals (SDGs) by fostering innovation, transparency, and inclusive economic growth.

Conclusion

Key Conclusions

This study demonstrates that Artificial Intelligence-enabled Green Public Procurement (AI-GPP) has significant potential to transform public procurement from a cost-driven administrative function into a strategic instrument for sustainable development. By integrating AI technologies with lifecycle carbon assessment, supplier sustainability evaluation, and data-driven governance, AI-GPP can improve procurement efficiency, transparency, and accountability while supporting low-carbon infrastructure and renewable energy investment. The proposed framework contributes to the existing body of knowledge by providing a comprehensive and scalable model that links digital transformation with energy transition and climate-resilient public investment in ASEAN economies.

Policy Implications & Recommendations

