

Preliminary Findings on Collaborative Approach Elements in Influencing Green Procurement Implementation for Construction Projects

Zafikha Aida Bidin^{*1}, Asmah Alia Mohamad Bohari², Norfashiha Hashim³, Khalid Zanudin⁴

^{1,2}College of Built Environment, Universiti Teknologi Mara, Cawangan Sarawak

³College of Built Environment, Universiti Teknologi Mara, Shah Alam

⁴Faculty of Social Science and Humanities, Universiti Malaysia Sarawak

*Corresponding Author

DOI: <https://dx.doi.org/10.47772/IJRISS.2024.8120344>

Received: 02 January 2025; Accepted: 06 January 2025; Published: 23 January 2025

ABSTRACT

Successfully implementing green procurement in construction projects is crucial for achieving green goals. This study investigates the collaborative approach elements influencing green procurement implementation within the construction industry. Key elements such as vision and relationship, structure, communication, authority, accountability, responsibilities, resources, and rewards are explored. Preliminary findings reveal that effective stakeholder collaboration significantly enhances the implementation process, addressing challenges and advancing towards a shared commitment to green goals. The study further validates the importance of these collaborative elements through empirical analysis, highlighting their practical relevance for construction stakeholders. The study employs a comprehensive methodology to achieve this objective, integrating an in-depth literature review with qualitative data and focus group discussion. Data analysis is conducted using thematic analysis to deliberate outputs from the discussion. It enables systematic exploration of preliminary findings on collaborative approach elements and their impact on green procurement outcomes. These findings contribute to a deeper understanding of collaborative strategies, offering practical insights for enhancing green procurement practices in construction projects.

Keywords: Collaborative Approach, Green Procurement, Construction

INTRODUCTION

Background of Green Procurement (GP) in Construction

Green procurement (GP) in the construction industry is essential for minimizing environmental impacts and promoting sustainability in line with Sustainable Development Goals (SDGs) 12, which highlight sustainable consumption and production. This aligns with the core principles of green procurement, which focuses on acquiring goods and services that reduce environmental impact throughout their lifecycle.

Green procurement (GP) is still in its early stages and is a relatively new concept in the Malaysian construction industry (Yap et al., 2024). Green procurement is well-established in countries like Germany, the United Kingdom, and Australia, and Malaysia has also incorporated it into its economic planning through the MyHijau initiative (Bohari et al., 2017). The Malaysian government has launched several efforts to promote green procurement in the construction sector, underscoring its importance in achieving sustainable development goals. The Malaysian government has taken steps to promote green procurement in construction projects by encouraging the use of sustainability assessment tools in projects such as PhJKR (Public Works Department Green Rating Tool), MyCREST (Malaysian Carbon Reduction and Environmental Sustainability Tool) and GBI (Green Building Index).

While gaining attention, green procurement implementation faces several challenges that hinder its implementation. Green procurement in the construction industry requires a paradigm shift from conventional procurement to a greener approach (AlNuaimi & Khan, 2019). Sustainable construction and green procurement are not achievable by organizations working in isolation; they require the collaboration of all construction project stakeholders (Varsei et al., 2014). The construction industry in Malaysia involves a diverse range of stakeholders, including government bodies, developers, contractors, consultants, architects, suppliers, and end users. Each stakeholder has distinct roles, objectives, and expectations, making aligning interest towards green procurement challenging. The lack of a unified approach often leads to fragmented efforts in implementing green practices.

This study focuses on the preliminary findings of collaborative approach elements influencing green procurement implementation for construction projects. It aims to identify the key collaborative approach and understand the role of collaboration among diverse stakeholders in overcoming challenges and driving green procurement practices. This study also provides actionable insights and a key focus to foster more substantial stakeholder alignment and enhance the effectiveness of green procurement implementation. By addressing these objectives, the study contributes to understanding the collaborative dynamics in advancing sustainable and environmentally responsible practices in the construction industry.

LITERATURE REVIEW

Green Procurement (GP): Definition and Importance

Green procurement (GP) is defined as the purchasing of products and services that minimize potential threats to the environment and human health (Najmi et al., 2020). The concept was first introduced in the National Technology Policy (NGTP) in 2009 and further developed under MyHijau Program (2012) by Ministry of Energy, Green Technology and Water (KETTHA) and Malaysian Green Technology and Climate Change Corporation Company (MGTC). For the construction industry, Green Procurement for Works focuses on minimizing the environmental impact of construction activities across all phases of the lifecycle of buildings and other physical infrastructure (Khan et al., 2018).

Green procurement (GP) offers various benefits across environmental, economic, and social dimensions. Environmentally, it reduces pollution, conserves natural resources, lowers greenhouse gas emissions, and supports a circular economy by minimizing environmental impacts throughout the lifecycle of products and processes (Yap et al., 2023; Diófási-Kovács & Tátrai, 2024). Economically, GP drives sustainable growth by promoting green logistics and innovation. It enhances competition through green technologies and positively impacts financial performance (Rashid et al., 2024; Sandra Marcelline et al., 2022). Moreover, the increase in green procurement implementation can upscale local greenmarking in terms of the production of green materials and products for construction. Socially, green procurement improves community quality of life by mitigating environmental hazards and encourages public sector engagement in sustainable building practices, nurturing a resource-efficient economy (Yap et al., 2023; Finamore & Oltean-Dumbrava, 2022).

Despite these benefits, green procurement's successful implementation in the construction industry requires a collaborative approach. Collaboration among all construction project stakeholders is essential to address the complexities of integrating green practices and ensuring the adoption of green procurement strategies. This collaborative effort will foster shared responsibility, promote innovation, and align stakeholders' objectives towards achieving environmentally, economically, and socially sustainable outcomes.

However, despite the recognized benefits and the necessity of collaboration, implementing green procurement in the construction industry is challenging. Understanding these challenges is crucial to developing effective strategies for overcoming them and ensuring the successful implementation of green procurement practices.

Challenges to Green Procurement Implementation

Construction projects typically span multiple phases: planning, design, procurement, construction, operation, and maintenance. Each phase presents opportunities for incorporating green procurement practices. However, the level of adoption varies across phases due to factors such as cost concerns, limited awareness, and insufficient technical expertise. Integrating green into every phase remains a key challenge. The following sections outline

the green procurement challenges.

The lack of effective collaboration, coupled with inadequate commitment and limited support from top management, poses significant challenges to green procurement. Leal et al. (2020) and Moradi et al. (2022) emphasize the issue of ineffective stakeholder collaboration. Moreover, green procurement faces significant economic and institutional challenges. High initial costs for sustainable materials and technologies remain a significant barrier, particularly in countries like Malaysia, where financial constraints limit green practices (Yap et al., 2024). In the United Arab Emirates (UAE), managing costs effectively while balancing sustainability and economic feasibility further complicates implementation (Al Hazza et al., 2023).

Additionally, the lack of strict government regulations and policies discourages stakeholders from adopting green practices. Insufficient commitment from top management in Malaysia further hampers prioritizing and implementing green procurement strategies (Yap et al., 2024; Al Hazza et al., 2023).

Knowledge and expertise barriers also hinder green procurement implementation. A limited of skilled professionals capable of implementing green technologies is a significant issue, as highlighted in the Australian construction industry (Memari et al., 2023). Furthermore, limited stakeholder awareness about the benefits and practices of green procurement restricts its widespread implementation (Yap et al., 2024; Al Hazza et al., 2023).

Table 1.0 summarises some of the key challenges of green procurement implementation.

Table 1.0: Green Procurement Challenges

Authors/ Challenges	Leal et al. (2020)	Moradi et al. (2022)	Al Hazza et al. (2023)	Khaderi et al. (2022)	Yap et al. (2024)	Memari et al. (2023)	Banihashemi et al. (2022)	Guo et al. (2019)	Al Nuaimi and Khan (2019)	Willar et al. (2020)	Ogunsanya et al. (2019)
Collaboration	•	•									
Commitment			•	•				•			
High initial costs			•		•					•	
Lack of expertise						•	•				
Awareness and knowledge gaps			•						•		
Policies and guidelines				•	•						•

Despite these challenges, the potential for a collaborative approach to green procurement (GP) in Malaysia's construction industry is substantial. Achieving this transformation requires a unified effort from all construction stakeholders to overcome challenges and maximize the benefits of GP. However, the fragmented nature of current practices highlights the need for a more coordinated and collaborative approach to realize the full potential of green procurement. The potential for a collaborative approach to green procurement (GP) in Malaysia's construction industry is significant, but challenges persist. Key challenges include poor collaboration, lack of commitment, high initial costs, limited expertise, knowledge gaps, and inadequate policies identified by various studies. Addressing these issues requires unified stakeholder efforts and enhanced collaboration.

The Role of Collaboration in Green Procurement (GP)

Collaboration is where the higher-level integration of stakeholders and authority share similar authority and responsibility and collaborate towards a common goal (Herazo & Lizarralde, 2015). It is also described as an advanced form of stakeholder integration, where participants share similar levels of authority and responsibility,

working collectively to achieve the desired goal (Herazo & Lizarralde, 2015). A paradigm shift in stakeholders' engagement and communication is essential to address the complexities of decision-making in the construction process. Collaboration has been promoted to enhance stakeholders' understanding and willingness to participate effectively in construction. Collaboration emphasizes continuous communication among stakeholders, fostering trust, consensus, and mutual understanding while improving their capacity to make collective decisions.

In recent years, the construction industry has increasingly acknowledged the importance of a collaborative approach, especially for complex, large-scale projects and those with sustainability goals. Collaboration in construction involves various stakeholders, including project owners, designers, contractors, suppliers, and regulatory bodies, who work together to enhance project performance, improve quality, and minimize risks. This collaborative strategy is essential for achieving greener project outcomes and aligns seamlessly with green construction and procurement principles. Furthermore, adopting this approach will drive the construction industry towards more sustainable practices, contributing to broader environmental and social objectives.

A collaborative approach is vital in successfully implementing green procurement, as it encompasses multiple dimensions, including sustainability standards, environmental impact assessments, and lifecycle analysis (Sönnichsen & Clement, 2020). Organizations can leverage expertise across various departments such as procurements, environmental management, legal, and finance by fostering collaboration. (Callens et al., 2022). Furthermore, collaboration strengthens partnerships through active supplier engagement and commitment, essential for meeting environmental standards. This approach encourages suppliers to invest in green practices and develop environmentally friendly products (Andalib Ardakani et al., 2023). For construction stakeholders, a collaborative approach enhances transparency and accountability, facilitating clear and open communication throughout green procurement processes. This ensures that all parties are well-informed about expectations, roles, standards, and progress (Andhov et al., 2020). Adopting a collaborative approach in green procurement fosters innovation, builds strong relationships, aligns stakeholders with green objectives, and ultimately drives more effective and sustainable procurement outcomes.

This collaborative mindset, established in the early pre-construction stage, is crucial to the success of green procurement throughout the construction phase. It ensures that the vision, responsibilities, resources, and rewards are well-aligned and effectively managed across all stakeholders. With shared goals, trust, and clear communication channels, collaboration enables efficient resource utilization, timely progress, and meeting sustainability targets. Moreover, it drives continuous improvement in green procurement practices by fostering a culture of accountability and innovation, ensuring that green procurement objectives are not only met but continuously optimized throughout the project lifecycle among the construction project stakeholders.

For this study, the Mattessich collaborative model was used to analyse and explain how the elements of collaboration contribute to the successful implementation of green procurement in construction projects. Mattessich's collaborative model provides a strong and detailed theoretical framework to explain how the dimensions of collaboration, such as vision, structure, communication, authority, accountability, resources, and rewards, contribute to the successful implementation of green procurement. The collaborative approach creates a conducive environment for integrating green into construction practices. This collaboration ensures that green procurement objectives are met efficiently, driving the construction industry toward more sustainable outcomes.

Vision and relationship

The vision and relationships within an organization are key to successful collaboration. Orr (2013) and Selin et al. (2000) stressed the importance of early, inclusive stakeholder involvement for effective information sharing. This early engagement is critical because it allows stakeholders to align their efforts, ensuring that green procurement's environmental objectives are prioritized. Huxham and Vangen (2013) highlighted the significance of collaboration levels, with early engagement influenced by project complexity and goals. Faris et al. (2022) and Bennett Gadlin (2012) pointed out that a clear project vision and shared expectations are crucial for ensuring all stakeholders understand and align on project goals. Shared vision ensures all parties understand the desired outcomes, whether reducing environmental impact or achieving cost savings, and work towards those goals collectively, strengthening the relationship between stakeholders and facilitating the successful implementation of green procurement strategies.

Structure

The project teams' structure and characteristics play a vital role in facilitating effective collaboration. Group characteristics, such as team composition, structure, and cohesiveness, are also important for effective collaboration (Austin & Baldwin, 1991; Cooke et al., 2012). A well-structured team with clearly defined roles and responsibilities helps ensure that each stakeholder understands their contribution to the project. A flexible process that adapts to changing circumstances while meeting project goals is crucial, supported by a well-defined time frame and implementation plan (Cooke et al., 2012; Rahman et al., 2014). This adaptability ensures that the project remains on track to meet its green procurement objectives despite shifting circumstances. For green procurement, an organized and flexible structure, combined with clear guidelines and timelines, allows stakeholders to collaborate effectively, ensuring that green procurement practices are implemented successfully.

Communication

Clear communication is a basis for effective collaboration in green procurement (GP) for construction projects, enabling stakeholders to align their goals and share crucial information. Effective collaboration requires clear communication, information sharing, and teamwork to achieve common goals (Mattessich et al., 2001). Good communication is a key success factor, emphasizing transparency, honesty, and cohesive teamwork. Meetings are crucial for decision-making and information sharing (Assbeihat, 2016). These interactions ensure that all parties are well-informed and can discuss procurement strategies, challenges, and progress. Sharing information among team members is essential for decision-making and productivity (Rahman et al., 2014). In the context of GP, efficient communication enables stakeholders to navigate the complexities of green practices, coordinate efforts, and implement green procurement strategies that align with greener goals in construction projects.

Authority

In the context of Green Procurement implementation, Authority is critical in ensuring that decision-making and control are distributed among various stakeholders, such as government bodies, contractors, and suppliers. Mattessich et al. (2001) highlighted that in collaborative settings, authority is dispersed, with decision-making and control shared among various stakeholders, which is crucial for implementing GP strategies effectively. This shared leadership structure ensures control is not concentrated in a single leader but distributed across multiple individuals or teams. Mutual respect and cooperation are essential to guide the organization and make decisions collectively. Faris et al. (2022) highlighted the importance of contractual agreements, which outline the rights and responsibilities of the involved parties, ensuring clarity in the distribution of authority. This is essential in green procurement project implementation to ensure that all stakeholders understand their authority in the procurement process. Rules and regulations, as pointed out by Assbeihat (2016), are also critical for maintaining proper organizational structure and authority during collaboration to ensure GP goals are aligned across all parties.

Accountability and Responsibilities

Mattessich et al. (2001) emphasized the need for organizational commitment and leadership. Accountability refers to individuals or teams' responsibility for their actions, decisions, and contributions. Strong leadership is essential for establishing clear accountability, especially from local authorities, contractors, and governments, as it provides guidance and fosters trust among stakeholders. Assbeihat (2016), Deep et al. (2019), and Davis (2021) emphasized that accountability helps ensure that individuals or groups take ownership of their roles and responsibilities. In collaborative projects, clear and consistent leadership ensures everyone is accountable for their contributions, which is crucial for successfully implementing green procurement and building trust within teams. Faris et al. (2022) and Hudson (2018) emphasized the importance of clear roles, responsibilities, and behaviours in collaboration, noting that a cultural shift toward cooperation is necessary for project success.

Resources

Cooke et al. (2012) highlighted important collaborative elements such as accurate information, distinct ground rules, and accessible resources. Having reliable data on green materials, technologies, and best practices readily available to all stakeholders enabling informed decision-making and coordinated action. The availability of such resources is critical to overcoming challenges and ensuring the project's success. Administrative support is also

necessary to ensure smooth operations, allowing team members to focus on achieving objectives and overcoming challenges (Patel et al., 2012; Assbeihat, 2016). This is because administrative support is a resource that helps teams function effectively and achieve their objectives. It ensures that the necessary services and support systems are in place for the smooth execution of tasks and overcoming challenges. Having adequate resources, including technical information and administrative assistance, is crucial for maintaining momentum, addressing challenges, and ensuring the efficient execution of green procurement strategies.

Rewards

Rewards and motivation are also essential in fostering effective collaboration for GP implementation. Both intrinsic rewards, such as personal alignment with green goals, and extrinsic rewards, like financial incentives or recognition, motivate stakeholders to engage in green procurement efforts (Orr, 2013; Selin et al., 2000). Shared responsibility, risk, and reward, as emphasized by Hudson (2018), help build a sense of ownership and accountability among stakeholders. By ensuring that all parties are adequately motivated and rewarded, GP projects can drive successful implementation and achieve sustainability objectives in construction.

RESEARCH METHODOLOGY

Introduction to Research Framework

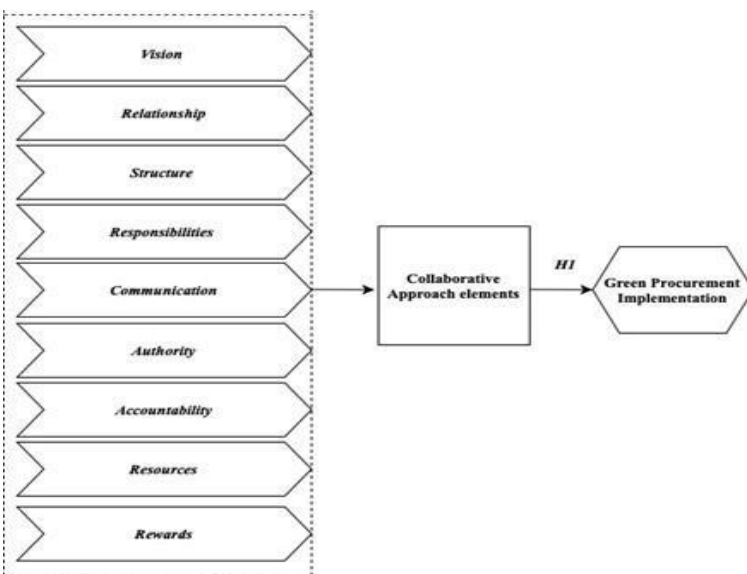
This study employs a review of existing literature provided the basis for identifying key collaborative elements and challenges in green procurement implementation. As for the primary data, the qualitative method was used to gather through focus group discussion (FGD).

Quantitative Data

In this study, the data quantitative data was collected through focus group discussions (FGDs), where participants were asked to share their experiences and opinions on collaborative approach elements for green procurement implementation. The focus group discussion (FGDs) involved fifteen (15) participants selected through purposive sampling, ensuring that all participants had relevant experience and knowledge in green practices and green procurement in construction. Purposive sampling was used to ensure that participants were specifically chosen based on their involvement in the planning and implementing green procurement and green practices, providing valuable insights for the study. The participants were from diverse backgrounds, including academia, industry, and government, with expertise in construction project procurement and green building practices. This will enhance the empirical validation of the conceptual framework.

Conceptual Framework

The study develops a conceptual framework based on the collaborative approach elements outlined by Mattessich et al. (2001), including vision, relationships, structure, responsibilities, communication, authority, accountability, , resources, and rewards. This framework links these elements to successful green procurement implementation and is the basis for hypothesis testing.



Thematic Analysis

As for qualitative data analysis, specifically thematic analysis to examine stakeholder perspectives on the collaborative approach elements influencing the implementation of green procurement in construction projects. Thematic analysis, as outlined by Braun and Clark (2006), involves identifying and analyzing recurring patterns or themes within the data, providing insights into how collaboration impacts green procurement practices. This provides a structured method to interpret the qualitative data, enabling the study to capture the complex dynamics of collaboration in green procurement practices.

FINDINGS AND ANALYSIS

Vision is a crucial element of collaboration, aligning organizational goals and ensuring clarity and commitment among stakeholders, which fosters long-term competitive advantages. A shared vision and strong, trust-based relationships are essential for collaboration, relying on early stakeholder involvement, mutual understanding of roles, and a commitment to shared goals. The focus group discussion revealed that while government stakeholders prioritize objective-oriented visions, the private sector is profit-driven, emphasizing the need for a shared green mindset between clients and consultants to promote greener approaches in construction projects.

Moreover, the critical role of a well-defined organizational structure, clear assignment of responsibilities, and effective communication channels in ensuring the success of green procurement initiatives. The insights drawn from the focus group discussions (FGD) emphasize the importance of aligning these elements to foster stakeholder collaboration, mitigate communication barriers, and ensure accountability in the procurement process. Table 1.0 highlights the importance of a well-structured organization, clear responsibilities, and effective communication in implementing green procurement successfully. The participants emphasized the need for alignment and coordination among stakeholders to meet green procurement goals.

The table also summarizes the key elements of authority and accountability in implementing green procurement based on the focus group discussions (FGDs) findings. It highlights the roles of various authorities, including government and private sector entities, in promoting green procurement practices, ensuring compliance, and setting clear guidelines. Additionally, the table outlines the importance of accountability in the decision-making process, emphasizing transparency, responsibility, and the need for strong leadership to drive successful green procurement initiatives. The insights from the FGDs underscore the challenges and gaps in the current implementation process, particularly in aligning practices with green standards.

The key findings from the literature review and focus group discussions (FGD) on the role of resources and rewards in facilitating green procurement implementation are also highlighted in Table 1.0. It highlights the significance of tangible and intangible resources in driving green procurement practices, particularly emphasising the financial and human capital needed for successful implementation. Additionally, the table outlines the importance of both monetary and non-monetary rewards in incentivizing stakeholders, such as contractors, to prioritize sustainability and environmentally friendly practices in their projects. Integrating these resources and rewards is crucial for promoting a culture of sustainability and ensuring compliance with green procurement goals.

Table 1.0: FGD findings for Collaborative Approach Elements in green procurement implementation.

Collaborative Approach Elements	Participant statements
Vision	<p>Government stakeholders focus on objective-oriented visions, while private sectors are more profit-driven. This difference highlights the need for alignment in green procurement goals.</p> <p>A shared green mindset between clients and consultants drives greener approaches to construction projects. "The client who has a green mindset usually will go for something green certified".</p>

Relationship	<p>Strong relationships based on trust are critical. Strategic relationships among stakeholders were emphasized as essential for effective collaboration in green procurement.</p> <p>“In private sector, it is important to have a committee that represents the client and each consultant as a push factor, motivating them towards a greener approach”.</p>
Structure	<p>"In our industry, there are no issues on the structure and responsibility because we have a team from client, consultant, and contractor."</p> <p>"Organizational structure plays an important role to carefully structure and have appropriate tools to capture the knowledge and awareness of stakeholders."</p> <p>"A steering committee is needed to monitor the project and ensure efficient information transfer."</p>
Communication	<p>"Green procurement requires a steering committee to monitor project implementation and ensure effective information transfer."</p> <p>Clients’ instructions and policies are critical for the success of green procurement.</p>
Responsibilities	<p>"The responsibility of green procurement must include departments that take care of the environment in the public sector."</p> <p>"If the procurement has stated that green procurement needs to be implemented, the whole team must follow and implement it as per the contract."</p>
Authority	<p>Clients must allocate funds for green initiatives and understand the life cycle cost (LCC) and return on investment (ROI).</p> <p>Authorities (public and private sectors) play key roles in promoting green procurement policies and ensuring compliance.</p> <p>Authorities must lead by example and align organizational structures with green objectives.</p>
Accountability	<p>Top management and ministries must understand and support green procurement.</p> <p>Paymasters in the private sector have a significant influence on green procurement implementation.</p>
Resources	<p>Clear policies and guidelines are essential to ensure proper implementation.</p> <p>The decision to adopt green practices depends on the client’s financial capacity and willingness to invest.</p> <p>Efficient resource utilization and collaboration are essential for green procurement success.</p>
Rewards	<p>Monetary rewards, like incentives tied to performance, encourage stakeholders to prioritize green practices.</p> <p>Non-monetary rewards (e.g., certificates, awards) recognize and motivate contractors to implement green practices.</p> <p>To reward contractors, CIDB proposes green incentives, such as "Program Penilaian Keupayaan dan Kemampuan Kontraktor” (SCORE). Tax exemptions are complex, but non-monetary rewards are effective.</p> <p>Both tangible and intangible resources are necessary for green procurement. Rewards motivate compliance and foster sustainability.</p>

The collaborative approach to green procurement is particularly crucial during the early pre-construction stage, where vision alignment, strong relationships, and clear organizational structures must be established to set the foundation for green initiatives. At this stage, government and private sector stakeholders need to align their objectives, ensuring that sustainability goals are integrated into project planning. The responsibilities for green procurement must be clearly defined, with top management, ministries, and authorities leading, ensuring that policies and guidelines are set for the entire project lifecycle. This early collaboration ensures that tangible and intangible resources are allocated efficiently and that all parties, including clients, consultants, and contractors, understand green procurement objectives.

This collaborative foundation becomes even more critical during the construction phase as the project progresses. Effective communication, continuous monitoring through steering committees, and adherence to the established structure and responsibilities are key to successfully implementing green procurement practices. Furthermore, allocating funds for green initiatives and using performance-based rewards during this phase incentivize stakeholders to prioritize sustainability. The entire process, from pre-construction to construction, requires ongoing collaboration, accountability, and resource management to meet green procurement goals and ensure long-term environmental and financial benefits. Figure 1.0 shows the preliminary findings of collaborative approach elements for green procurement in construction projects.

In summary, the findings validate the hypothesis tested through thematic analysis by demonstrating that the identified collaborative approach elements, such as vision, relationships, structure, responsibilities, communication, authority, accountability, resources, and rewards, are integral to successfully implementing green procurement. The empirical insights from the study provide evidence for the conceptual framework and the proposed relationship in the hypothesis.

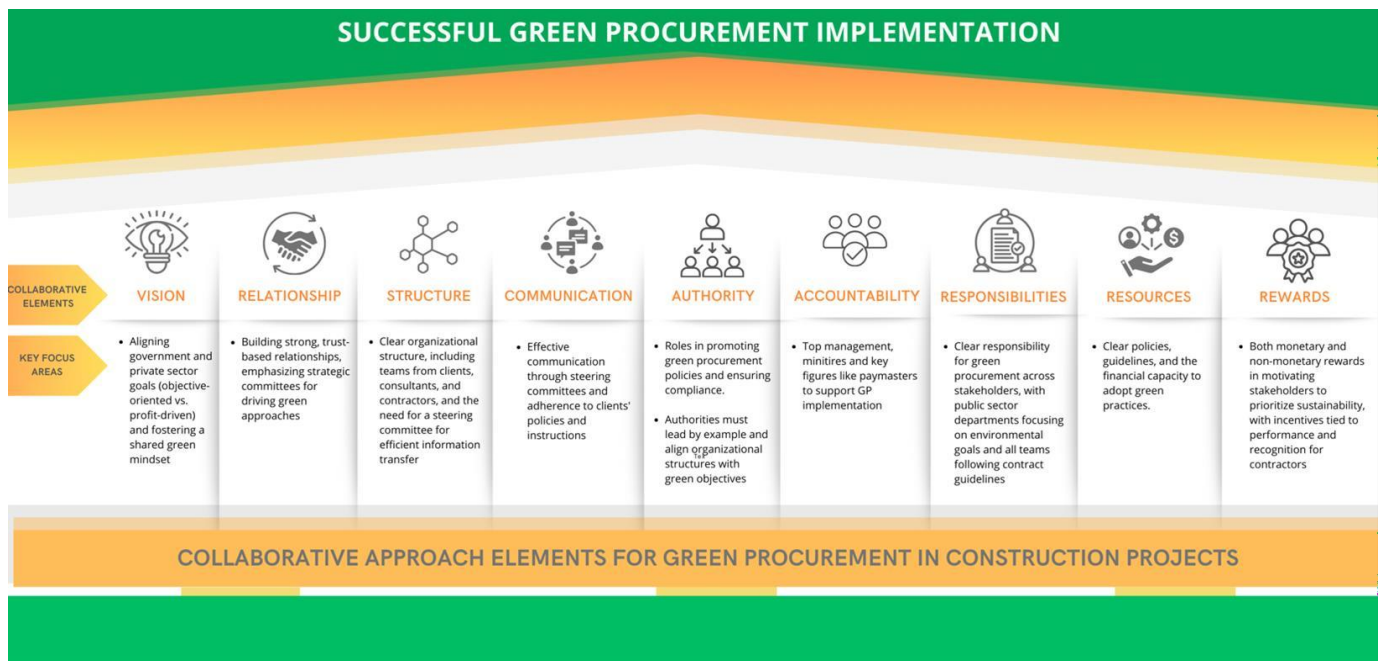


Figure 1.0: Collaborative approach elements for green procurement in construction projects.

Source: Authors

DISCUSSIONS

The findings of this study underscore the vital role that collaboration plays in the successful implementation of green procurement in the construction industry. The results emphasize the importance of aligning visions, establishing strong relationships among stakeholders, and ensuring a well-structured and organized approach to the procurement process.

A key finding from the focus group discussions (FGDs) is the necessity of a shared vision among both government and private sector stakeholders. Government stakeholders tend to focus on objective-oriented

visions prioritising sustainability and long-term environmental benefits, while profit motives often drive the private sector. This difference highlights the need for alignment between these two sectors, especially in green procurement. A shared green mindset between clients and consultants can bridge this gap, ensuring that both parties work toward common sustainability goals. The emphasis on a shared vision as a driving force for collaboration resonates with previous research suggesting that a unified approach is crucial for achieving successful green procurement outcomes.

The study found that a well-defined organizational structure, clear responsibilities, and effective communication are crucial for fostering collaboration. The focus group discussions (FGDs) highlighted the importance of a steering committee overseeing the project, monitoring progress, and facilitating information exchange. This aligns with Mattessich et al.'s (2001) framework for collaboration, which underscores the need for structure and communication to overcome barriers and enhance collaboration. A robust organizational structure ensures that roles and responsibilities are clearly defined, which is essential for successfully implementing green procurement initiatives.

Additionally, the findings emphasize the significance of authority and accountability in promoting green procurement practices. Authorities, including both public and private sector entities, must take the lead in advocating for green procurement policies and ensuring compliance. This is consistent with the literature suggesting that top-down leadership is vital for advancing green initiatives. Moreover, accountability mechanisms must be established to ensure stakeholders adhere to the established guidelines and standards. The FGDs stressed that top management, ministries, and other authorities must support green procurement and lead by example, demonstrating their commitment to sustainability through their actions and decisions.

Another important finding pertains to the role of resources and rewards in promoting green procurement. The focus group discussions (FGDs) revealed that both tangible resources, such as financial support, and intangible resources, including human capital and knowledge, are essential for successfully implementing green procurement practices. Additionally, monetary and non-monetary rewards are significant motivators for stakeholders to prioritize sustainability in their projects. The study emphasized the importance of incentives, such as performance-based rewards and certifications, in encouraging contractors to adopt green practices. This finding aligns with previous research indicating that incentives can effectively motivate stakeholders to prioritize environmental objectives, ensuring that green procurement goals are achieved.

A collaborative approach to green procurement is particularly crucial during the early pre-construction phase, where the groundwork for green initiatives is established. During this phase, aligning the vision, building strong relationships, and clearly defining responsibilities ensure all stakeholders are aligned and committed to achieving sustainability goals. Furthermore, allocating resources and rewards during this stage is crucial for paving the way for successful implementation of green procurement. As the project moves into the construction phase, ongoing collaboration, monitoring, and accountability become essential to maintain momentum and ensure adherence to green procurement practices.

The study's findings highlight that the successful implementation of green procurement in construction projects relies significantly on stakeholder collaboration. A shared vision, strong relationships, clear organizational structures, effective communication, and the alignment of resources and rewards are essential for fostering collaboration and ensuring that green procurement objectives are met. By addressing these factors and overcoming the challenges identified in the study, stakeholders can work together to create a more sustainable and environmentally responsible construction industry.

CONCLUSIONS AND RECOMMENDATIONS

The successful implementation of green procurement in construction projects is essential for advancing towards greener goals and achieving long-term environmental benefits. This study has investigated the elements of collaborative approach that significantly influence the implementation of green procurement within the construction industry. Key elements such as vision and relationships, organizational structure, communication, authority, accountability, responsibilities, resources, and rewards have been identified as crucial to advancing effective collaboration among stakeholders. Preliminary findings highlight that collaboration is fundamental in

overcoming the challenges faced during green procurement implementation. Effective collaboration enhances stakeholders' engagement, aligns objectives, and drives commitment towards greener goals. The study further validates the importance of these collaborative elements through empirical analysis, reinforcing their practical relevance in the construction sector. By integrating an integrative literature review and qualitative data from focus group discussions, this research offers valuable insights into the strategies stakeholders can adopt to enhance the success of green procurement initiatives.

Data analysis conducted using thematic analysis has enabled a systematic exploration of these collaborative strategies, providing a deeper understanding of their impact on green procurement outcomes. The findings underscore the necessity of a shared vision, strong relationships, clear organizational structures, and well-defined responsibilities to ensure the smooth implementation of green procurement practices. Furthermore, the role of resources and rewards, both tangible and intangible, has been emphasized as key drivers for incentivizing stakeholders to prioritize sustainability in construction projects.

In conclusion, this study contributes to a more comprehensive understanding of the collaborative approaches and strategies needed to enhance green procurement practices in the construction industry. The insights from this study offer practical guidance for stakeholders to strengthen their collaborative efforts, ultimately fostering more sustainable and environmentally responsible construction projects in line with Sustainable Development Goals (SDGs) 12. By embracing these collaborative strategies, the industry can overcome current barriers and move closer to achieving its green procurement goals.

ACKNOWLEDGEMENT

This work is supported by the Dana Kecemerlangan (DKCM) 2023 (Grant Number 11/2023/KCMS) under the Universiti Teknologi MARA Branch.

Ethical Considerations

This study adhered to ethical research practices and obtained approval from the UiTM Research Ethics Committee (REC). The research proposal, "Collaborative Approach Structural Model for Successful Implementation of Green Procurement in Construction Projects in Peninsular Malaysia," was reviewed and approved under the reference number REC/03/2023 (PG/MR/76).

Data Availability Statement

The data supporting the findings of this study can be obtained from the corresponding author upon reasonable request.

REFERENCES

1. Al Hazza, M. H., Muqtadar, M., El Salamony, K., Bourini, I. F., Sakhrieh, A., & Alnahhal, M. (2023). Investigation study of the challenges in green procurement implementation in construction projects in UAE. *Civil Engineering Journal*, 9(4), 849-859.
2. AlNuaimi, B. K., & Khan, M. (2019). Public-sector green procurement in the United Arab Emirates: Innovation capability and commitment to change. *Journal of cleaner production*, 233, 482-489.
3. Andalib Ardakani, D., Soltanmohammadi, A., & Seuring, S. (2023). The impact of customer and supplier collaboration on green supply chain performance. *Benchmarking: An International Journal*, 30(7), 2248-2274.
4. Andhov, M., Caranta, R., Stoffel, T., Grandia, J., Janssen, W. A., Vornicu, R., & Wiesbrock, A. (2020). Sustainability through public procurement: the way forward—Reform Proposals.
5. Assbeihat, J. M. (2016). The impact of collaboration among members on team's performance. *Management and Administrative Sciences Review*, 5(5), 248-259.
6. Austin, A. E., & Baldwin, R. G. (1991). Faculty Collaboration: Enhancing the Quality of Scholarship and Teaching. ASHE-ERIC Higher Education Report No. 7, 1991. ERIC Clearinghouse on Higher Education, George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036.

7. Banihashemi, S. A., Khalilzadeh, M., Antucheviciene, J., & Edalatpanah, S. A. (2023). Identifying and prioritizing the challenges and obstacles of the green supply chain management in the construction industry using the fuzzy BWM method. *Buildings*, 13(1), 38.
8. Bennett, L. M., & Gadlin, H. (2012). Collaboration and team science: from theory to practice. *Journal of Investigative Medicine*, 60(5), 768-775.
9. Bohari, A. A. M., Skitmore, M., Xia, B., & Teo, M. (2017). Green oriented procurement for building projects: Preliminary findings from Malaysia. *Journal of Cleaner Production*, 148, 690-700.
10. Callens, C., Verhoest, K., & Boon, J. (2022). Combined effects of procurement and collaboration on innovation in public-private partnerships: a qualitative comparative analysis of 24 infrastructure projects. *Public Management Review*, 24(6), 860-881.
11. Cooke, B., Langford, W. T., Gordon, A., & Bekessy, S. (2012). Social context and the role of collaborative policy making for private land conservation. *Journal of Environmental Planning and Management*, 55(4), 469-485.
12. Deep, S., T. Gajendran, and M. Jefferies. (2019). "A systematic review of 'enablers of collaboration' among the participants in construction projects." *Int. J. Construct. Manage.* 2019 (Mar): 1–13.
13. Diófási-Kovács, O., & Tátrai, T. (2024). Environmentally Sustainable Public Procurement of Construction Projects—Implementing Circularity Approach. *Public Works Management & Policy*, 1087724X241290269.
14. Faris, H., Gaterell, M., & Hutchinson, D. (2022). Investigating underlying factors of collaboration for construction projects in emerging economies using exploratory factor analysis. *International journal of construction management*, 22(3), 514-526.
15. Finamore, M., & Oltean-Dumbrava, C. (2022). Green Public Procurement and the circularity of the built environment. In *IOP Conference Series: Earth and Environmental Science*(Vol. 1122, No. 1, p. 012054). IOP Publishing.
16. Guo, L., Xu, Y., Liu, G., Wang, T., & Du, C. (2019). Understanding firm performance on green sustainable practices through managers' ascribed responsibility and waste management: Green self-efficacy as moderator. *Sustainability*, 11(18), 4976.
17. Herazo, B., and G. Lizarralde. (2015). "The influence of green building certifications in collaboration and innovation processes." *Constr. Man- age. Econ.* 33 (4): 279–298.
18. Hudson, M. E. (2018). Book Review: *Educating Students with Severe and Multiple Disabilities: A Collaborative Approach*, by Orelove, FP, Sobsey, D., & Gilles, DL (Eds.)
19. Huxham, C., & Vangen, S. (2013). *Managing to collaborate: The theory and practice of collaborative advantage*. Routledge.
20. Khaderi, S. S., Yub, Y., Bakri, A. S., & Abd Shukor, A. S. (2022). Green procurement implementation in construction industry: analysis of developer's challenges. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1067, No. 1, p. 012052). IOP Publishing.
21. Khan, M. W. A., Ting, N. H., Kuang, L. C., Darun, M. R., Mehfooz, U., & Khamidi, M. F. (2018). Green procurement in construction industry: a theoretical perspective of enablers and barriers. In *MATEC web of conferences* (Vol. 203, p. 02012). EDP Sciences.
22. Leal, A. R., Perez-Castillo, D., Amorós, J. E., & Husted, B. W. (2020). Municipal green purchasing in Mexico: Policy adoption and implementation success. *Sustainability*, 12(20), 8339.
23. Mattessich, P., Murray-Close, M., & Monsey, B. (2001). *Wilder collaboration factors inventory*. St. Paul, MN: Wilder Research.
24. Memari, A., Ogunmakinde, O. E., & Aghajani, M. (2023). Classification of Green Procurement Risks Across the Project Lifecycle in Australian Construction Projects. In *2023 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*(pp. 0230-0233). IEE
25. Moradi, S., Kähkönen, K. and Sormunen, P. (2022), "Analytical and conceptual perspectives toward behavioral elements of collaborative delivery models in construction projects", *Buildings*, Vol. 12 No. 3, p. 316.
26. Najmi, A., Maqbool, H., Ahmed, W., & Rehman, S. A. U. (2020). The influence of greening the suppliers on environmental and economic performance. *International Journal of Business Performance and Supply Chain Modelling*, 11(1), 69-90.
27. Ogunsanya, O. A., Aigbavboa, C. O., Thwala, D. W., & Edwards, D. J. (2022). Barriers to sustainable procurement in the Nigerian construction industry: an exploratory factor analysis. *International Journal*

- of Construction Management, 22(5), 861-872.
28. Orr, S. K. (2013). Environmental policymaking and stakeholder collaboration: Theory and practice. CRC Press.
 29. Patel, H., Pettitt, M., & Wilson, J. R. (2012). Factors of collaborative working: A framework for a collaboration model. *Applied ergonomics*, 43(1), 1-26.
 30. Rashid, A., Khan, S., Shah, A., & Ali, S. (2024). Interplay of Green Construction Procurement and Logistic Service Innovation: Advancing Sustainable Economic Growth and Sustainable Development Goals. *International Journal of Social Science & Entrepreneurship*, 4(1), 1-21.
 31. Sandra Marcelline, T. R., Chengang, Y., Ralison Ny Avotra, A. A., Hussain, Z., Zonia, J. E., & Nawaz, A. (2022). Impact of green construction procurement on achieving sustainable economic growth influencing green logistic services management and innovation practices. *Frontiers in Environmental Science*, 9, 815928.
 32. Selin, S. W., Schuett, M. A., & Carr, D. (2000). Modeling stakeholder perceptions of collaborative initiative effectiveness. *Society & natural resources*, 13(8), 735-745.
 33. Sönnichsen, S. D., & Clement, J. (2020). Review of green and sustainable public procurement: Towards circular public procurement. *Journal of cleaner production*, 245, 118901.
 34. Varsei, M., Soosay, C., Fahimnia, B., & Sarkis, J. (2014). Framing sustainability performance of supply chains with multidimensional indicators. *Supply Chain Management: An International Journal*, 19(3), 242-257.
 35. Willar, D., Waney, E. V. Y., Pangemanan, D. D. G., & Mait, R. E. G. (2021). Sustainable construction practices in the execution of infrastructure projects: The extent of implementation. *Smart and Sustainable Built Environment*, 10(1), 106-124.
 36. Yap, J. B. H., Teh, Y. H., Loo, S. C., & Sulaiman, Z. B. (2024). Benefits of green procurement: perspectives from the Malaysian construction industry. *International Journal of Construction Management*, 24(14), 1530-1539.
 37. Yap, J. B. H., Teh, Y. H., Loo, S. C., & Sulaiman, Z. B. (2024). Benefits of green procurement: perspectives from the Malaysian construction industry. *International Journal of Construction Management*, 24(14), 1530-1539.