

Sustainable Public Procurement in Construction Industry in Egypt

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Abstract - Construction sector has an important role to have a sustainable and carbon-neutral economy. Sustainable public procurement (SPP) is a strategic approach that promotes integration of the pillars of sustainable development. Sustainability improves resource efficiency, reduces environmental impact, and promote social equity. As Egypt continues to urbanize rapidly, it faces many challenges related to climate change, waste management, resource depletion, and social inequality. This study investigated the sustainable public procurement practices in Egypt based on literature review, survey and interviews with experienced practitioners to determine the challenges of implementing sustainable public procurement. The findings revealed that the cost impact and the policies and regulations are the most important barriers for adoption of SPP. This study introduces elements of sustainable public procurement strategy in order to overcome the obstacles found. Also a detailed unified SPP award criteria taking sustainability into consideration is developed.

Key Words: Sustainable Public Procurement - Sustainable Public Procurement Strategy – Award Criteria- Circular Economy

I. INTRODUCTION

Procurement is a powerful agent of change, that have important multidimensional tools capable of integrating green practices throughout the project development [1], [2], [3], [4].

Sustainable Public Procurement (SPP) is one of the priorities in the Sustainable Consumption and Production National Action Plan of Egypt and in the Sustainable Development Strategy for Egypt 2030 that the Ministry of Planning has developed. Sustainable public procurement is a strategic approach that promotes integration of economic , social, environmental, and quality institutional governance.

Green Procurement (GP) is a process in which private, public and semi-public authorities meet their needs for goods, services, works and utilities by choosing solutions that have a less impact on the environment throughout their lifecycle, as compared to alternative solutions. [5], [6]. Green procurement is “Procurement activities of products, services and works considering environmental criteria that conserve the natural

environment and resources which reduce the negative impact of human activities” [7].

Contractors should be aware that all public clients consider that sustainable green procurement includes the social dimension of contracts by taking account of their impact on employment, social inclusion, human rights and ethical or fair trade. Public authorities are trying to implement an approach to procurement which takes both environmental and social factors into account.

This study investigates the sustainable public procurement practices in Egypt based on literature review, survey and interviews with experienced practitioners to determine the challenges in application of SPP in Egypt, then develop a sustainable public procurement strategy and a detailed Egyptian SPP award criteria to be used in assessing tenders in construction industry.

II. LITERATURE REVIEW

A. Challenges of Sustainable Procurement Implementation

Five major barriers to sustainable construction procurement were identified , i.e. high costs, lack of green procurement laws and regulations, lack of expertise, lack of management commitment, and inadequate knowledge [8]. The barriers for developing sustainable procurement are lack of enforcement, high cost, lack of awareness, culture and insufficient tools / indicators, and lack of commitment [9]. The most critical barriers to sustainable procurement are summarized and categorized in table 1 [10].

B. Benefits and Enablers of Sustainable Procurement Implementation

The benefits associated with SPP implementation include environmental, social, health, economic and political benefits. [25]

TABLE I. BARRIERS TO SUSTAINABLE PROCUREMENT

Barrier category	Barriers	Source
Industrial	Lack of integration between different activities and processes	[11], [12]
Attitudinal	Different interests	[12]
Institutional	Lack of laws and regulations	[13], [14]
Industrial	High investment cost	[14], [15], [16], [17], [18]
Industrial	Limited resource and lack of qualified subcontractors	[19]
Industrial	Insufficient tools, systems and information about sustainable materials	[20], [21], [18]
Industrial	Insufficient experience with green materials	[16]
Industrial	Technical problems regarding the use of green materials	[16]
Industrial	Lack of data and material information	[20], [22]
Institutional	Lack of common standards and methods for collecting digital data	[20], [21], [22]
Industrial	business model	[23]
Attitudinal	Top-down approach	[24]

The most important enablers to sustainable procurement are Regulations and standards, Lifecycle considerations and technology, Management commitments, Green principles and techniques, Green design with financial benefits, Stakeholders collaboration [26].

The Singaporean construction industry was surveyed and revealed that there are three main elements to overcome barriers and initiate SP which are: First, provision of governmental economic incentives for professionals, research and development, and green products/ technologies usage. Second, public education and awareness. Third, the usage of high-performance green building delivery systems [27].

III. METHODOLOGY

In order to understand and analyze the current situation of sustainable public procurement practices in Egypt. First, a literature review of the benefits and challenges in implementation of SPP. Second, a survey with 20 experts to determine the challenges in application of SPP in Egypt was done. The survey addressed the main barriers for implementing SPP in details. After the analysis of the survey, interviews were done with those experts to discuss how to overcome the challenges found. One of the main strategies discussed in the interviews was to have a clear SPP strategy and having a unified award criteria to be used in assessing tenders in construction industry. In the last step, a detailed SPP strategy and a detailed

Egyptian SPP award criteria are developed. A weight and scoring system for each sustainability criteria are discussed in details.

IV. DATA ANALYSIS AND DISCUSSION

A. Data collection

In order to analyze the current situation of sustainable public procurement in Egypt, and due to that SPP in Egypt is still in early stages, a survey with 20 experts was done during the period from July to September 2024. 80 % of the experts have experience more than 10 years while only 5 % have less than 5 years. Their organizational role varies between consultant, contractor, owner and others as shown in Fig. 1. The majority are consultant and owner.

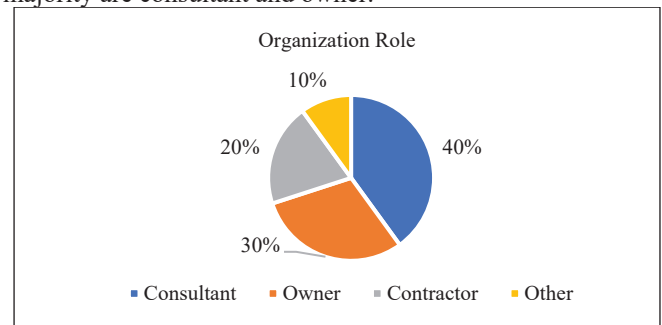


Fig. 1: Organizational Role Distribution

B. Barriers of applying SPP

The survey addresses the barriers in Egypt regarding applying SPP, six main barriers were chosen and the effect of each is asked about: Sustainability Commitment, Knowledge and Innovation, Cost Impact, Awareness and Readiness, Training and Development, Policies, Regulations & Guidelines.

According to the designed questionnaire, a three-point ascending Likert scale ranging from 1 to 3 was used to rank the responses of importance level of the barriers , where “1” refers to low effect, and “3” refers to High effect.

Relative importance index (RII) has been used to rank the relative importance according to (1) ,

$$RII = \frac{W}{A*N} = \frac{\sum_{i=1}^4 element\ frequency * i}{A*N} \quad (1)$$

where:

W = Total weight of element, i = element weight of each frequency, A = Highest weight = 3, N = Total number of respondents =20

Table 2 shows that the cost impact is the most important barrier followed by polices and regulations. Only Awareness and Training barriers are moderate and, the rest have high importance

Then each barrier is discussed in details. The effect of the main reasons for having this barrier is asked about.

TABLE 2. RELATIVE IMPORTANCE INDEX OF THE MAIN BARRIERS

Main Barriers	Sum of weighted frequency	RII
Sustainability Commitment	50	0.833
Knowledge and Innovation	50	0.833
Cost Impact	55	0.917
Awareness and Readiness	45	0.750
Training and Development	45	0.750
Policies, Regulations & Guidelines	51	0.850
	296	

C. Sustainability Commitment

The experts were asked about their opinion for the effect of the main reasons for not having Sustainability Commitment. As shown in Fig. 2, The results revealed that both lack of management support and Lack of commitment from industry players have high effect while The reduced appeal of sustainable construction materials for clients have medium effect.

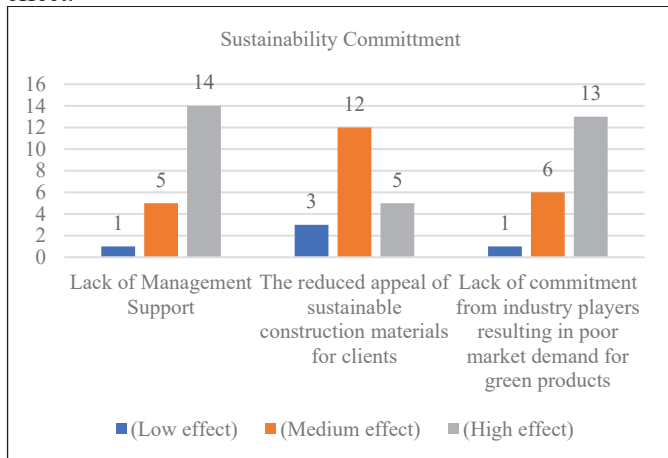


Fig. 2: Sustainability Commitment Barrier

D. Knowledge and Innovation

The experts were asked about their opinion for the effect of the main reasons for not having enough Knowledge and Innovation. As shown in Fig.3, The results revealed that both Non-capability of integrating green procurement policy into existing policy and Unavailability of capable and expert human resources have medium effect while the rest have high effect.

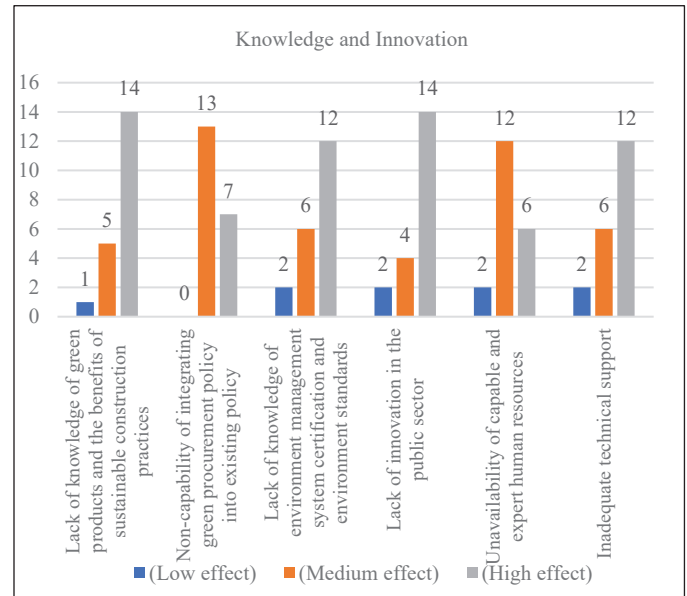


Fig. 3: Knowledge and Innovation Barrier

E. Cost Impact

The experts were asked about their opinion for the effect of the main reasons for having cost impact as a barrier. As shown in fig. 4, The results revealed that both Perception of higher cost for adhering to green procurement and Higher costs due to inadequate resources for green products have high effect while Lack of inclusion of financial incentives toward green procurement has medium effect.

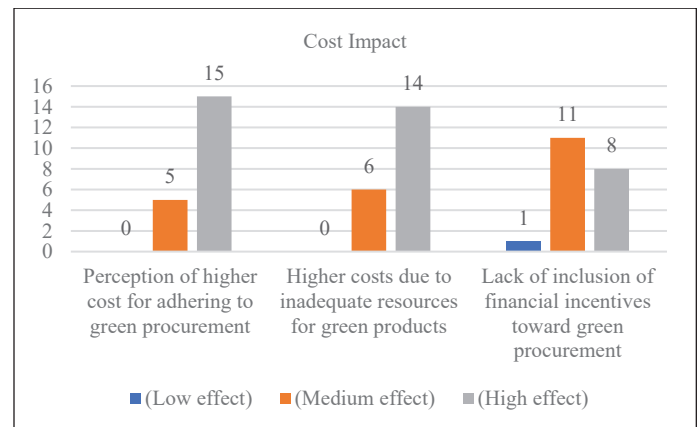


Fig. 4: Cost Impact Barrier

F. Awareness and Readiness

The effect of the main reasons for having Awareness and Readiness as a barrier were also discussed. As shown in table 3, the results revealed that only Inadequate information on the potential construction market for sustainable construction materials and Inadequate awareness of research and development in green purchasing have medium effect while the rest have high effect.

TABLE 3. AWARENESS AND READINESS BARRIER

Reason	Low effect	Medium effect	High effect
Inadequate public awareness about the importance of green procurement in construction project	2	5	13
Inadequate information on the potential construction market for sustainable construction materials	4	10	6
Inadequate awareness of the importance of green corporate strategy	1	5	14
Poor availability of green construction materials/ solutions in the local market	1	6	13
Inadequate awareness of research and development in green purchasing	3	9	8

G. Training and Development

The effect of the main reasons for having Training and Development as a barrier were also discussed. The results revealed that Lack of organized green purchasing structure have high effect while Inadequate training on adopting a green culture have medium effect.

H. Policies, Regulations & Guidelines

The effect of the main reasons for having Awareness and Readiness as a barrier were also discussed. As shown in table 4, the results revealed that all reasons have high effect with insufficient incentive policies in adopting green practices have the highest effect.

TABLE 4. POLICIES, REGULATIONS & GUIDELINES BARRIER

Reason	Low effect	Medium effect	High effect
Lack of stringent policy/guideline for driving sustainable practices in construction procurement	2	6	12
Non-availability of enforcement policy of relevant laws	1	7	12
Insufficient incentive policies in adopting green practices	2	5	13

V. SUSTAINABLE PUBLIC PROCUREMENT STRATEGY

Sustainable public procurement plays a crucial role in achieving a circular economy by shifting purchasing practices towards products and services that minimize waste, maximize resource use, and promote environmental responsibility. Procurement strategies have substantial impact to influence requirements for more sustainable and circular goods and services.

One of the main solutions discussed in the interviews to overcome the barriers that hinder the application of SPP in Egypt which is related to Policies and Regulations, was to have a clear SPP strategy and having a unified award criteria to be used in assessing tenders in construction industry. The Strategy

would not only help in achieving national goals, but also align with global trends towards greener and more socially responsible practices.

Before addressing the elements of the SPP strategy, First , there are some government initiatives that should be considered:

- **National Sustainable Development Strategy (Egypt Vision 2030):** Egypt's Vision 2030 includes sustainability goals, such as the promotion of energy-efficient buildings, sustainable infrastructure, and green construction practices. This creates an impetus for integrating sustainability into public procurement processes.[28]
- **Green Building Codes: Green Pyramid Rating System (GPRS),** which encourages sustainable building practices [29]
- **International Agreements:** Egypt is a signatory to various international environmental agreements, such as the **Paris Agreement**, which commits the country to reduce its carbon emissions and enhance climate resilience. These commitments influence public procurement policies and drive the adoption of sustainable practices.
- **Smart Cities Initiatives:** the Egyptian government has embarked on ambitious smart city projects, such as the construction of New Administrative Capital. These projects emphasize sustainability through the use of energy-efficient buildings, waste management, and green spaces, and they incorporate principles of sustainable procurement.
- **Private Sector Involvement:** Some private companies in Egypt are pioneering sustainability in construction by voluntarily adopting green building certifications, using recycled materials, and implementing energy-efficient solutions.

This paper developed a SPP strategy for Egypt that focus on the elements summarized in fig. 5. These elements were selected based on the analysis of the survey and discussions with the experts, where high-impact issues in the sustainable procurement process and the most effective steps to resolve them were identified.



Fig.5: Sustainable Public Procurement Strategy Elements

VI. SUSTAINABLE PUBLIC PROCUREMENT AWARD CRITERIA

The construction industry typically tenders and awards project contracts based on lowest bids that emphasize only time, cost and quality and pay a little attention to sustainability and circular economy. To support the application of Sustainable Public Procurement, it is important to have a unified award criteria in assessing tenders in construction industry that encourage applying sustainability in award criteria. In this paper, Tenders with a focus on sustainability are addressed and a weight for each item of the proposals is suggested as follows: financial offer (40%), Technical proposal (20%) and Sustainability proposal (40%). The Financial offer includes Price and Lifecycle Cost; showing fixed and variable costs, maintenance, operations, and any special adjustments. The Technical proposal stands for the

evaluation of the capability of the proposed team. It addresses qualifications, technical knowledge, and past performance showing key staff, their functions, and relevant experience, in addition to construction & project delivery method. The sustainability proposal includes the criteria that are typically structured around pillars of sustainability, including environmental, social, economic, governance, health and safety. This paper developed a weight for each sustainability criteria and developed a scoring system to help in assessing them. The suggested weights are presented in table 5 and they are discussed with the experts and follows [30], [31], [32], [33]. Table 6 shows the scoring of the developed sustainability criteria for construction projects in Egypt, which can be used by public authorities when assessing tenders.

By implementing these sustainable procurement criteria, public entities can ensure that construction projects not only meet budget and functional needs but also contribute positively

to environmental stewardship, social responsibility, and economic resilience.

TABLE 5. SUSTAINABLE CRITERIA AND THEIR WEIGHT

Environmental (40%)	Social (25%)	Economic & innovation (20%)	Governance, Health & safety (15%)
Energy & Water Efficiency	Labor Practices	Cost Efficiency	Transparency
Carbon Footprint and emissions	Diversity and Inclusion	Innovation and Technological Advancements	Compliance
Waste Management	Local Employment and Training		Safety Management Systems
Eco friendly local materials & green certifications	Community engagement		

TABLE 6. SUSTAINABLE CRITERIA SCORING

Environmental	Social	Economical	Governance, Health & safety
40: Outstanding environmental management plan, low-carbon strategies, extensive use of sustainable and locally sourced materials, and waste reduction measures. Highly innovative, and sustainable design with green certifications	25: Comprehensive social impact strategy, including strong community engagement, fair labor practices, local employment, diversity initiatives	20: Well-developed cost-benefit analysis that highlights life-cycle savings, maintenance costs, supports local businesses, use of technology, and strong value for money.	15: Clear governance framework, transparency in procurement, and full compliance with laws and regulations.
20: Limited attention to environmental sustainability with minimal use of green materials and low focus on carbon reduction.	12.5: Basic efforts in promoting fair labor practices, limited community impact, and some local employment.	10: Basic economic analysis, limited innovation, or cost-saving efforts.	7.5: Basic governance but lacking transparency or full legal compliance.
0: No clear environmental strategy, unsustainable practices.	0: No social responsibility practices, poor worker conditions, failure to engage with the community.	0: No consideration for life-cycle costs, or the project is not economically sustainable.	0: No governance or ethical transparency measures.

I. CONCLUSION

Sustainable public procurement in Egypt's construction sector is still in its early stages but holds significant potential for improving environmental outcomes, promoting social equity, and enhancing economic development. To fully harness the benefits of sustainable procurement, Egypt needs to strengthen its regulatory frameworks, raise awareness and capacity in the construction industry, and foster public-private collaboration. Integrating sustainability into construction procurement is crucial for achieving long-term sustainability and resilience in the face of climate change.

To determine the challenges in implementing sustainable public procurement in Egypt, this study investigated the sustainable public procurement practices in Egypt based on literature review, survey and interviews with experienced practitioners. The findings revealed that the cost impact and the policies and regulations are the most important barriers for adoption of SPP. This research developed a detailed SPP strategy in order to overcome the challenges found. Then a detailed unified SPP award criteria to be used in assessing tenders is also developed taking sustainability into consideration. A weight and scoring system for each sustainability criteria are discussed in details.

REFERENCES

- Bratt, C., Hallstedt, S., Robert, K.H., Broman, G., Oldmark, J., 2013, "Assessment of criteria development for public procurement from a strategic sustainability perspective," Journal of Cleaner Production, vol.52, pp.309-316, 2013.
- Preuss, L. "Addressing sustainable development through public procurement: The case of local government," Supply Chain Management Journal , vol. 14 no. 3, pp. 213-223,2009.
- Ruparathna, R., Hewage, K., 2015, "Sustainable procurement in Canadian construction industry: current practices, drivers and opportunities," Journal of Cleaner Production, vol.109, pp. 305-314, 2015.
- Zsidisin, G.A., Hendrick, T.E.,1998, "Purchasing's Involvement in Environmental Issues: A Multi-Country Perspective," Industrial Management & Data Systems, vol. 98, pp. 313-320, 1998.
- EC, European Commission, 2016, Buying green! A handbook on green public procurement, 3rd edition, 2016.
- EU Green Public Procurement (GPP) criteria for the design, construction, renovation, demolition and management of buildings. Joint Research Centre (JRC), 2022, European Commission.
- Rais, S., Bidin, Z., Bohari, A., Saferi, M., 2018, " The Possible Challenges of Green Procurement Implementation," IOP Conference Series Materials Science and Engineering, 2018.
- Bidin, Z., Rais, S., Bohari, A., Saferi, M., 2019, "A S.W.A.T. Analysis of Green Procurement Implementation in Construction Projects," IOP Conference Series Earth and Environmental Science 385(1):012017, (2019)
- Khan, S., Chen, J., Zhang Y., Golpira, H., 2018, "Does Ethical Leadership Really Act as a positive Role in Sustainable Supply Chain Management?," 4th International Conference on Social Science and Higher Education (ICSSHE 2018), 2018.
- Gundersen, H., 2022, Green construction project procurement , Master thesis BI Norwegian Business School.
- Ershadi, M., Goodarzi, F., 2021, "Core capabilities for achieving sustainable construction project management," Sustainable Production and Consumption, vol. 28, pp. 1396-1410,2021b)

- 12- Górecki, J., Núñez-Cacho, P., Corpas-Iglesias, F., Molina, V., 2019, "How to convince players in construction market? Strategies for effective implementation of circular economy in construction sector," *Cogent Engineering*, ISSN:2331-1916, 2019.
- 13- Lewis, C., Weiner, B., Stanick, C., Fischer, S., 2015, "Advancing implementation science through measure development and evaluation: a study protocol," *Implementation Science*, 2015.
- 14- Sadri, H., Pourbagheri, P., & Yitmen, I. (2022). Towards the implications of Boverket's climate declaration act for sustainability indices in the Swedish construction industry. *Building and Environment*, 207, 108446. <https://doi.org/10.1016/j.buildenv.2021.108446>
- 15- Ageron, B., Gunasekaran, A., Spalanzani, A., 2012, "Sustainable supply management: An empirical study," *International Journal of Production Economics*, vol. 140, pp. 168-182, 2012)
- 16- Shen, L., Zhang, Z., & Long, Z. (2017). Significant barriers to green procurement in real estate development. *Resources, Conservation and Recycling*, 116, 160–168. <https://doi.org/10.1016/j.resconrec.2016.10.004>
- 17- Bilal, M., Khan, K. I. A., Thaheem, M. J., & Nasir, A. R. (2020). Current state and barriers to the circular economy in the building sector: Towards a mitigation framework. *Journal of Cleaner Production*, 276, 123250. <https://doi.org/10.1016/j.jclepro.2020.123250>
- 18- Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R., & Jaca, C. (2018). Circular Economy in Spanish SMEs: Challenges and opportunities. *Journal of Cleaner Production*, 185, 157–167.
- 19- Han, Y., Skibniewski, M. J., & Wang, L. (2017). A Market Equilibrium Supply Chain Model for Supporting Self-Manufacturing or Outsourcing Decisions in Prefabricated Construction. *Sustainability*, 9(11), 2069. <https://doi.org/10.3390/su9112069>
- 20- Deloitte. (2020). Knowledge base for national circular economy strategy – Sub-study 2 Barriers to unlocking circular economy potential in Norway.
- 21- Hart, J., Adams, K., Giesekam, J., Tingley, D. D., & Pomponi, F. (2019). Barriers and drivers in a circular economy: The case of the built environment. *Procedia CIRP*, 80, 619–624. <https://doi.org/10.1016/j.procir.2018.12.015>
- 22- Akadiri, P. O. (2015). Understanding barriers affecting the selection of sustainable materials in building projects. *Journal of Building Engineering*, 4, 86–93. <https://doi.org/10.1016/j.jobbe.2015.08.006>
- 23- Guerra, B. C., & Leite, F. (2021). Circular economy in the construction industry: An overview of United States stakeholders' awareness, major challenges, and enablers. *Resources, Conservation and Recycling*, 170, 105617. <https://doi.org/10.1016/j.resconrec.2021.105617>
- 24- Vennström, A., & Eriksson, P. E. (2010). Client perceived barriers to change of the construction process. *Construction Innovation*, 10(2), 126–137. <https://doi-org.ezproxy.library.bi.no/10.1108/14714171011037156>
- 25- EU Procurement for a Circular Economy, CE Center, European Commission ,2024.
- 26- Wong, J. K. W., Chan, J. K. S., & Wadu, M. J. (2016). Facilitating effective green procurement in construction projects: An empirical study of the enablers. *Journal of Cleaner Production*, 135, 859–871. <https://doi.org/10.1016/j.jclepro.2016.07.001>
- 27- Hwang, B., Tan, J., 2012, "Green Building Project Management: Obstacles and Solutions for Sustainable Development," *Sustainable Development*, vol. 20, pp. 335-349, (2012).
- 28- National Sustainable Development Strategy (Egypt Vision 2030), Ministry of Planning, Economic Development & International Cooperation.
- 29- Green Pyramid Rating System , 2017.
- 30- Standard Operating Procedure and Toolkit, For the Procurement of Sustainable Infrastructure, eic european international contractors –efca european engineering consultants, 2023
- 31- Guide 5 to Sustainable Procurement Evaluate Suppliers and Award, Government Procurement Development Group | Ministry of Economic Development, New Zealand, 2010.
- 32- Cerexhe J., 2025, "Tender
- 33- Evaluation Criteria: a practical guide," Mastt