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Study on Green Certification Criteria Relevant to Landscape Architecture Projects in Malaysia

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Study on Green Certification Criteria Relevant to Landscape Architecture Projects in Malaysia

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Introduction

Aim

To distil the existing green certification criteria
to those that are relevant to
landscape architecture projects

Objectives

1. To determine if the landscape industry in Malaysia needs such a scoped-down set of criteria and guidelines
2. To extract the key criteria from green guidelines and certifications in Malaysia

Hypothesis

There exist criteria from the existing green certifications in Malaysia that are relevant to landscape architecture projects, in order of relevance and/or importance

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Background

Green assessment & certifications in Malaysia

1. Green Building Index (GBI), 2009
2. Green Real Estate (RE), 2013
3. *Skim Penilaian Penarafan Hijau* JKR (PHJKR) (Translated as Green Level Assessment Scheme), 2012
4. Green Performance Assessment System (Green PASS), 2012
5. Sustainability Index (SUSDEX), 2010

Green assessment & certifications in Malaysia

6. Low Carbon Cities Framework and Assessment System (LCCF), 2011
7. My Green Highway Index (MyGHI), 2014
8. Melaka Green Seal, 2011
9. CASBEE Iskandar, 2016
10. Malaysian Carbon Reduction and Environmental Sustainability Tools (MyCREST), 2016

Green Building Index

- Introduced in 2009
- Formulated and developed by the Association of Consultancy Engineers Malaysia (ACEM) and the *Pertubuhan Arkitek Malaysia* (PAM)
- Acts as a benchmark for the environmental impact and performance of new and existing buildings in a tropical climate such as in Malaysia
- Guidelines accompanying the certification includes the improvement of energy efficiency and sustainable use of water and material resources

Green Building Index

- Objective 1: To raise awareness of environmental issues, such as innovative solutions for saving energy and water in buildings, enhanced public transport connectivity, and indoor environments which promote health and well-being
- Objective 2: To promote sustainable practices in building design, construction, and operations within the built environment industry, which encompass planners, architects, engineers, developers, contractors and the general public

Green Building Index

- Structured into three tiers, with 3 groups in the highest level:
 - GBI Accreditation Panel (GBIAP)
 - GBI Certifiers
 - GBI Facilitators
- 6 criteria for assessment:
 - Indoor Environmental Quality
 - Sustainable Site Planning
 - Sustainable Site Management
 - Materials and Resources
 - Water Efficiency
 - Innovation

Green Building Index

- Each criterion broken down into elements:
 - ecology assessment, green vehicle and parking, innovative design, flood management, and community diversity
- Classification categories:
 - Non-Residential New Construction
 - Residential New Construction
 - Non-Residential Existing Building (NREB)
 - Township
 - Industrial New Construction
 - NREB: Historic Building, Hospital, Resort, and Hotel

Green Building Index

- The scoring system is by points:
 - Platinum = 86+ points
 - Gold = 76-85 points
 - Silver = 66-75 points
 - Certified = 50-65 points

Incentives

- The Malaysian Industrial Development Industry (MIDA) – handle investments and tax incentives in 2014
- Green construction activities by the government
- National Green Technology Policy (NGTP) responsible in assessing and certifying projects to meet the green criteria.
- 100% tax exemption

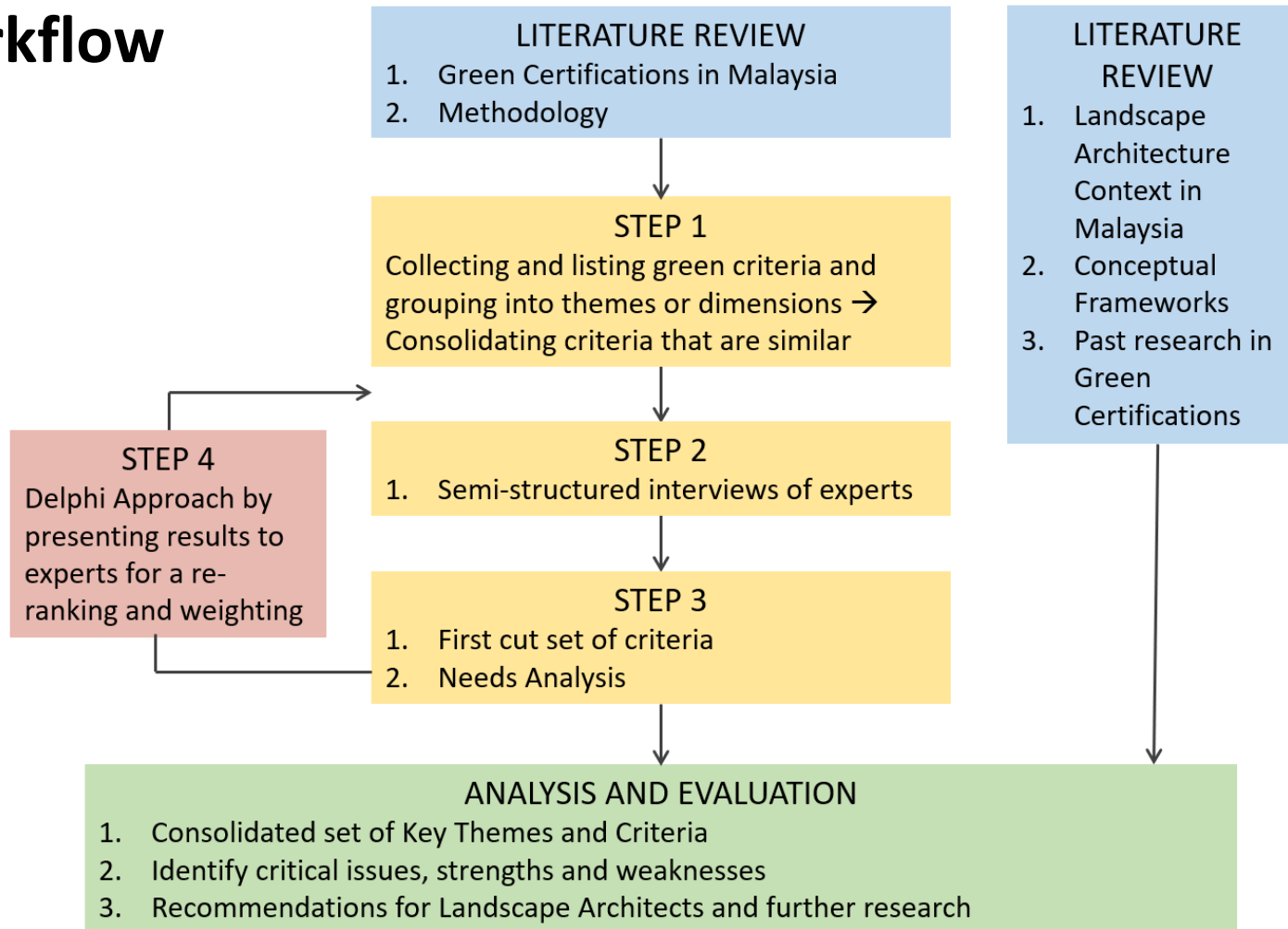
Incentives

- Investment Tax Allowances and Income Tax Exemptions on green projects are qualified for 100% capital expenditure and statutory income until 2020
- MIDA showcased the advantages of companies seeking out to receive certification for the tax incentives

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Methodology

Workflow



Step 1: Grouping and consolidation of criteria

| Theme | Number of criteria |
|------------------------------|-----------------------|
| Community | 13 |
| Environmental Sustainability | 18 |
| Conservation and Land Use | 14 |
| Transport | 10 |
| Governance | 3 |
| Innovation and Quality | 15 |
| TOTAL | 73 |

Step 2: Questionnaire

- Section 1: Analytic Hierarchy Process to determine key themes
- Section 2: Ranking of criteria
- Section 3: Qualitative questions
- Section 4: Personal data

Step 2: Respondents

| Name | Company | Registered with ILAM |
|--|-----------------------------|--------------------------|
| LAr. Noor Jahan Mohamad Mokhtar | WDI Design Sdn. Bhd. | Yes |
| Mohd. Zaid Othman, Manager | Forever Bloom Enterprise | No |
| LAr. Ang See May | May Design Sdn. Bhd. | Yes, Corporate Member |

Section 1: Analytic Hierarchy Process to determine key themes

START OF QUESTIONNAIRE

SECTION 1: DIMENSIONS OR THEMES OF THE GREEN CERTIFICATIONS IN MALAYSIA
WHICH ARE RELEVANT TO LANDSCAPE ARCHITECTS

Increasing weight to item on the LEFT Increasing weight to item on the RIGHT

9 8 7 6 5 4 3 2 1 0 1 1/2 1/3 1/4 1/5 1/6 1/7 1/8 1/9

QUESTION:
How much more weight would you give the theme on the right over the theme on the left considering its relevance and importance to Landscape Architects?

| | | |
|-----------------------------|----------------------|---------------------------|
| ENVIROMENTAL SUSTAINABILITY | <input type="text"/> | COMMUNITY |
| ENVIROMENTAL SUSTAINABILITY | <input type="text"/> | GOVERNANCE |
| ENVIROMENTAL SUSTAINABILITY | <input type="text"/> | CONSERVATION AND LAND USE |
| ENVIROMENTAL SUSTAINABILITY | <input type="text"/> | TRANSPORT |
| ENVIROMENTAL SUSTAINABILITY | <input type="text"/> | INNOVATION AND QUALITY |
| COMMUNITY | <input type="text"/> | GOVERNANCE |
| COMMUNITY | <input type="text"/> | CONSERVATION AND LAND USE |

Section 1: Analytic Hierarchy Process to determine key themes

- <https://bpmsg.com/ahp/ahp-calc.php>

AHP Priority Calculator

Language: [English](#) [German](#)

AHP Criteria

Select number and names of criteria, then start pairwise comparisons to calculate priorities using the Analytic Hierarchy Process.

Select number of criteria:

Input number and names (2 - 20) OK

Pairwise Comparison

3 pairwise comparison(s). Please do the pairwise comparison of all criteria. When completed, click *Check Consistency* to get the priorities.

With respect to *AHP priorities*, which criterion is more important, and how much more on a scale 1 to 9?

| A - wrt AHP priorities - or B? | Equal | How much more? |
|---|---|----------------|
| 1 <input checked="" type="radio"/> Crit-1 <input type="radio"/> Crit-2 <input checked="" type="radio"/> 1 | <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 | |
| 2 <input checked="" type="radio"/> Crit-1 <input type="radio"/> Crit-3 <input checked="" type="radio"/> 1 | <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 | |
| 3 <input checked="" type="radio"/> Crit-2 <input type="radio"/> Crit-3 <input checked="" type="radio"/> 1 | <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 | |

CR = 0% Please start pairwise comparison

AHP Scale: 1- Equal Importance, 3- Moderate importance, 5- Strong importance, 7- Very strong importance, 9- Extreme importance (2,4,6,8 values in-between).

AHP Priority Calculator

ENVIRONMENTAL SUSTAINABILITY TRANSPORT

However, if I consider that the item on the right, 'Transport', is of strong importance (weight of 5) versus the item on the left, 'Environmental Sustainability', then write the reciprocal or 1/5 in the box in between them (refer to Figure 1):

ENVIRONMENTAL SUSTAINABILITY TRANSPORT

Section 2: Ranking of criteria

SECTION 2: RANKING OF VARIOUS CRITERIA WITHIN EACH THEME

Instruction: For each theme or dimension below, tick in the second column if you have used it in projects. For the last column, assign a rank of one (1) for the most important or useful criteria for Landscape Architects, followed by two (2), three (3) and so on to the least important or useful criteria.

PART A: ENVIRONMENTAL SUSTAINABILITY (WATER, WASTE, AIR, ENERGY AND CLIMATE)

| CRITERIA | USED BEFORE (✓) | RANK |
|--|--------------------|------|
| Reduce waste pollution and material waste from construction activities; observe waste hauled into landfills | | |
| Implement Erosion and Sedimentation Control (ESC) that conforms to approved erosion and sedimentation requirements for construction activities and ongoing landscape operations | | |
| Proper disposal of domestic waste, provide hygienic facilities, septic tank, sullage collection systems, proper grease traps, disposal plan; hazardous waste with planned and licensed waste disposal/ on-site treatment | | |
| Avoid toxic and non-polluting pesticides, and environmentally non-polluting methods and chemicals for cleaning and painting building exterior | | |
| Recycle materials and wastewater, including recycling facilities, waste-sorting | | |
| Minimize or eliminate water pollution by reducing impervious cover, increase on-site infiltration, eliminate source of water runoff & remove pollutants from stormwater runoff | | |
| Recycle organic/landscape waste to meet at least 50% of landscape fertilizer needs | | |
| Utilize reused products and materials; building products that incorporate recycled material during production | | |
| Encourage Industrialized Building System (IBS) and reduce on-site construction | | |

Step 3: Needs Analysis

- How green certifications can be relevant to landscape architects in Malaysia
- Sections 1 and 2 are objective needs
- Section 3 explores subjective needs → qualitative questions
 - Are Green Certifications such as the Green Building Index useful for Landscape Architects in Malaysia? Why?
 - What are some of the potential challenges faced by Landscape Architects in applying Green Certifications to various projects?
 - Suggest how some of these challenges can be managed.
 - Which aspects or criteria are relatively easier to be applied to projects?

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Results & Discussion

Section 1: Analytic Hierarchy Process to determine key themes

| | Respondent 1 and ranking | Respondent 2 and ranking | Geometric Mean and ranking |
|---------------------------------|-----------------------------|-----------------------------|----------------------------------|
| ENVIRONMENTAL SUSTAINABILITY | 25.9% = 2 | 33.9% = 2 | <u>29.6% = 2</u> |
| COMMUNITY | 17.6% = 3 | 12.5% = 3 | 14.8% = 3 |
| GOVERNANCE | 7.7% = 5 | 4.8% = 5 | 6.08% = 5 |
| CONSERVATION AND LAND USE | 35.7% = 1 | 36.8% = 1 | <u>36.2% = 1</u> |
| TRANSPORT | 4.4% = 6 | 4.3% = 6 | 4.35% = 6 |
| INNOVATION AND QUALITY | 8.7% = 4 | 7.7% = 4 | 8.18% = 4 |
| CONSISTENCY RATIO | 6.6% | 8.9% | |

Section 2: Ranking of criteria

- Highlight top criteria for each theme, the digit shown indicates how many experts have used it before
- Conservation and Land Use (14 criteria)
 - Biodiversity Action Plan x 1
 - Ecological Assessments x 1
 - Site Management Plan for maintenance x 1
 - Maximize open space with high ratio provision to promote biodiversity and reduce carbon footprint x 2
 - Conservation and restoration x 2
 - Conserve land and green spaces for community x 2

Section 2: Ranking of criteria

- Environmental Sustainability (18 criteria)
 - Mitigate Urban Heat Island effect by providing recreational green space x 1
 - Mitigate Urban Heat Island effect by specifying that 50% of open space should be vegetated x 1
 - Mitigate Urban Heat Island effect by providing shade, green cover, open water/water features, and/or cross-ventilation air flow x 1
 - Recycle materials and waste water x 1
 - Flood management x 0

Section 2: Ranking of criteria

- Community (13 criteria)
 - Site is close to basic amenities x 2
 - Provide service reserve which acknowledges pedestrian paths and cycleways, for all services for all public spaces x 2
 - Adopt universal design x 3
 - Provide community centre and/or sports centre/club x 3
 - Development with design that complies to guidelines for “security-in-planning” x 0

Section 2: Ranking of criteria

- Innovation and Quality (15 criteria)
 - Innovation in vertical greenery x 2
 - Innovation in drainage systems x 2
 - Innovation in lighting x 2
 - Innovation in food production x 2
 - Innovation in water conservation x 1
- Governance (3 criteria – only top one highlighted)
 - Participation of local government in community participation and maintenance of sustainable practices x 1

Section 2: Ranking of criteria

- Transport (10 criteria)
 - Accessibility for people x 1
 - Undertake a site-specific travel assessment and developing a travel plan in order to promote sustainable reductions in transport burdens x 1
 - Increase connectivity to reduce car use x 1
 - Promote universal design x 2

Section 2: Criteria used before but not key criteria

- Conservation and Land Use (14 criteria)
 - Introduce new landscape design that integrates with the existing natural elements x 3
 - Provide greenery with native plants, adaptive plants, and/or water bodies x 3
 - Proper plants selection to prevent harm to people, buildings or vehicles x 3
- Environmental Sustainability (18 criteria)
 - Ensure drainage systems, water bodies, roads and infrastructure will not be a source of water-borne diseases and vectors x 1

Section 2: Criteria used before but not key criteria

- Community (13 criteria)
 - Provision of complete coordinated plans for above and below ground services x 2
 - Sustainable practices: promote food gardening x 3
 - Protection of area with significant visual quality, and reducing visual blight x 2
- Innovation and Quality (15 criteria)
 - Innovation in construction x 2

Section 2: Criteria used before but not key criteria

- Governance (3 criteria): None
- Transport (10 criteria)
 - Promote walkable streets within pedestrian network x 3
 - Provide cycling network x 2
 - Multi-modal means of transport x 2

Section 3: Qualitative Questions

- Areas where the respondents think that is a strong need for it:
 1. Framework for Landscape Architecture Profession in Malaysia
 2. Evaluation of effectiveness and efficiency
 3. Reveal the different expectations of respondents
 4. Reveal the fundamental concern about their relevance amongst the landscape architecture professionals in Malaysia

Section 3: Question 1 – Usefulness

- Landscape has a minimal contribution
- Lack of education or awareness about such certifications
- The area where landscape potentially has a higher contribution is within the *Conservation & Land Use* and *Environmental Sustainability* themes

Section 3: Question 2 – Challenges

- Elements in the guidelines are not within the landscape architect's control i.e. during planning stage
- Developer is less concerned with non-profit generating items
- Developer only seeing green certifications as a tool to promote their products instead of the true purpose of these certifications in themselves

Section 3: Question 3 – Managing challenges

- Conservation should be part of regulations
- Tax deductions or other incentives can contribute to an increase in biodiversity upon development
- Widen the jurisdiction of landscape architects to include slope area management and stormwater planning alongside engineers
- Carry out extra courses and/or certification by ecologists and environmental engineers within the landscape industry

Section 3: Question 4 – Feasibility of application

- Items that are directly controlled by the landscape architect within their design, for example native trees, universal design and sustainable materials
- The community is a relational criterion, that is about the relationship between landscapes and people in their daily lives

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Conclusion & Recommendations

Significance of Research

- For both Malaysia and for the landscape architecture profession
- Most green certification and assessment systems are intended and designed for the building and construction industry → need to distil the key criteria and dimensions order to formulate an assessment and certification framework that is relevant to landscape architecture projects in Malaysia

Significance of Research

- A consensus between experts
 - Key themes: Conservation and Land Use, followed by Environmental Sustainability, and Community
 - Key criteria
- Exciting era
 - Cities and states recognise the need for biodiversity conservation, and climate change mitigation and adaptation → both key concerns of landscape architects → engender further research

Limitations of Research

1. Limited time frame of this research → only 3 out of 11 experts responded
2. Section 1 involving the Analytic Hierarchy Process is too difficult → need face-to-face interview
3. Focused only on the certification systems in Malaysia

Recommendations

1. Include criteria from an international array of green assessment and certification schemes.
2. Carry out the structured interview described above with more landscape architects as experts so as to strengthen the status of the key themes and criteria.
3. Carry out the structured interview with landscape architects in academia so as to enable a comparison of judgements between them and those in the industry.

Recommendations

4. Perform Stage 4, which is to present the results to the experts for at least one more round for a re-ranking and weighting of the criteria in a Delphi Approach. This can justify the findings even more.
5. Build a framework for assessment and certification that is relevant to landscape architecture projects in Malaysia. This includes formulating new metrics or fine-tune existing ones to support the framework.

Recommendations

6. Develop a conceptual framework between the existing green certifications in Malaysia and the landscape architecture profession.
7. Study why certain criteria which has been used by more than one respondent did emerge as key criteria, and yet why some of the key criteria have not be used before.

Thank you

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