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Choosing Tree for Urban Fabric: Role of Landscape Architect

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Abstract
This study explored the role of landscape architect in choosing trees for urban fabric. Two objectives have been formulated (i) to examine the process in selecting tree species among landscape architects and (ii) to determine the relationship between process and environmental constraints in selecting tree species for urban fabric. The findings showed that certain criteria of the environmental constraints are positively correlated and have strong relationship with tree selection process. The role of landscape architect is pertinent in tree selection. The findings of this research will contribute to process improvement in selecting tree species by landscape architects in the future.

Keywords: Urban fabric, environmental constraints,process,landscape architect

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1.0 Introduction
Urban fabric is the physical form of towns and cities. It refers to the physical urban environment, socio – cultural, ecological and economic structures. The element of urban trees are important and contribute to making city sustainable, attractive and vital urban design. Thus, this study appraises the process of choosing a tree for urban fabric among landscape architects. In Malaysia, urban tree management was managed by the local authority. Landscape architects and team are authorized to choosing the tree species for urban planting. In addition, person in top level of management also has the authority to make the decision making in choosing the tree species. However, the lacking in term of knowledgeable and expertise in process selecting right tree species cause the hazards to the public and properties (Amat, 2011). In addition, due to faults in selecting tree species, many things will happen such as pavement damage was fallen trees, increase the tree maintenances and blocking the windshield (Ramly et al., 2017). Because of that, the aim of this study is to ensure the selection of trees species is appropriate to the place and conditions. To achieve the aim, two objectives have been formulated, (i) to examine the process on selecting tree species among landscape architect and (ii) to determine the relationship between process and environmental constraints in selecting tree species for urban fabric.

2.0 Literature Review

2.1 Understanding the Value of Urban Trees for Quality of Urban Lifestyles
Urban trees are living organism and vital elements of a city's infrastructure should be considered at every stage of planning design and development. In order to properly design for tree, it is important to understand the value that urban trees can provide to any project. Benefits of urban trees are continuously discussed in previous research in term of environmental, social, economic, health, aesthetics

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benefits (Ramly et al., 2017; Vogt, 2017;Kondo ,2017; Salmond ,2016; Mullaney, 2015; Roy, 2012; Kadir, 2012; Chen and Jim, 2008; Buckelew et al, 2007; Nowak et al., 2006). All the benefits are contributed to creating urban fabric and improve quality of urban lifestyles. However, many professional practices lack the basic knowledge that underlies the science and art of incorporating trees into the urban fabric (Arnold, 1980). Certain urban design and public works standards show that little is known about the basic needs of trees and the selecting of the tree planting. This lack of understanding is a major contributing factor to trees not surviving. According to Moll (1989), the average street tree lives seven to ten years and provides a negative return on investment. Also, space constraints in cities mean that there are only limited opportunities for increasing tree density within existing urban fabric and it is unclear whether the net effect of increased vegetation in street canyons is beneficial or detrimental to urban air quality at local scales (Ng et al., 2015).

2.2 Urban Trees for Urban Fabric

The increased intensity of rapid development growth of urban areas often creates environmental conditions will not support the continuous existence of urban trees (Briber et al., 2015). Tree maintenance and tree management in urban areas, the street tree species selection has been integrated part of these. The related professional disciplines were mainly involved in street tree selection are landscape architects, landscape design and arboriculture (Friederike, 2011). Furthermore, the purposes of the street tree species selection are to find the appropriate tree species for particular roadside (Gerhold & Porter, 2007; Trowbridge & Bassuk, 2004 and Appleton, 2000).The method of selecting a tree species may be best described as a decision-making process in which to allow for numerous aspects such as economic factors have been described through tree species selection criteria (Hitchmough, 1994; Miller, 1997; Gerhold & Porter, 2007). In contrast to the information on tree selection criteria, insufficient publications look to the application of these criteria. Researchers from North America, Miller (1997) and Gerhold & Porter (2007) attempted to describe a tree selection process. Miller (1997) proposed a street tree species selection model that suggests that tree species selection depends on three main factors which are site factors; environmental and cultural constraint, economic factors and social factors.

2.3 Evolution of Tree Species Selection in Urban Fabric

This section will be discussing the five main studies in tree selection evolution. Tree Selection Model by Miller is select in this study. In this Model, researchers only focus on criteria of environmental constraints to correlate with the process of selection tree species. The selection is based on the suitable criteria which were suggested by Miller's Model and appropriate to verified in Malaysia's condition. A comparison of previous studies and their contribution to the tree species selection in urban area have been made and displays below (Table 1).

Table 1: A comparison of previous research and their contributions to the tree species selection

Previous research	Remarks
Street Tree Planning Framework (Amir and Misgav, 1990)	Criteria listed into primary (example tree size and form) and secondary importance (tree aesthetics). The street tree planning process includes a description of the street, setting preferences for street tree planting and site/ tree evaluation. Based on the information tree species are selected according to their suitability, preferred maintenance requirements, preferred aesthetics, preferred functional requirements and determination of number of tree species one street.
Tree Selection Model (Miller, 1997)	**General tree species selection aspects, such as environmental constraints, cultural constraints, social factors and economic factors. No process in the figure but some explanation in text. Filter tree species from an existing tree species list according to the selection aspects. No detail on the order of aspects or criteria.**
Tree selection process (Gerhold and Porter, 2007)	Five step tree selection process: definition of the purpose of the tree, evaluation of the site conditions, evaluation of arboricultural practices, development of selection criteria, and matching tree characteristics to the above steps.
Decision Support System (Kimbauer et al., 2009)	The tree selection criteria users were native or non-native species and site attributes. The system on broad-scale tree placement including some ecological criteria, such as age distribution, species diversity and tree placement. No integration of economic or social aspects into tree selection.
TreeSelect Modules (Friederike, 2011)	TreeSelect has seven modules which address different aspects of tree species selection which is identifying plantable and non- plantable locations for trees, tree selection based on policy strategies and other framework information, tree selection based on environmental and cultural constraints, tree selection based on economic and social criteria, tree placement for uneven age structure, physical tree placement for species diversity. Working with modules offered to break down the tree selection process into smaller, more manageable parts and made it easier to integrate ecological and biogeographical criteria.

2.4 The environmental constraint in Choosing Tree Species

The term environmental is used here to describe tree selection criteria that relate to the interactions of the tree with its physical surrounding. Environmental criteria were mainly described in the literature as environmental constraints or environmental limitations which confine the list of appropriate tree species (Zanetti et al., 2015; Sabo et al., 2005; Sabo et al., 2003; Appleton, 2000; Miller, 1997). Trees and other plants have found many different ways to adapt to stress environments including urban environments. These adaptations were not further specified here but listed according to the environmental constraint. For example, different tree species may show different ways of dealing with air pollution. Also, tolerance or adaptation to urban infrastructure and structure differs between tree species. Several publications in arboricultural research have presented potential solutions to some of the above limitations, especially for street tree plantings. An example is the use of tree root barriers to prevent curb lifting (Morgenroth, 2008; Smiley, 2008). Miller (1997), for example, referred to diversity and stability of the tree population, addressing species diversity and tree age diversity. Tree species diversity was emphasized by several authors (Ramesha et al., 2017; Dawud et al., 2016; Nguyen et al., 2016; Pedro et al., 2015) especially in regards to the spread of pests and diseases. Naderali et al., (2015), for example, described of *Roystonea regia* (Royal palm) due to Yellow Decline Disease (Phytoplasma (16SrI)) subsequently prompted attention about the risk of monoculture tree plantings

and also tree plantings that are dominated by only few tree species. Miller (1997), too, warned that using cultivars of only three or four tree species may not be in the interest of species diversity. However, to overcome monoculture or strongly dominated tree plantings, Miller (1997) suggested changing tree species either by street or by block. In his opinion, this would comply with desired uniformity in street design and maintenance efficiency. As an alternative, Miller (1997) proposed to select tree species with similar appearance and similar physiological requirements. Four important criteria in environmental constraint are listed which are climatic, Edaphic, physiographic and biologic. All these criteria are tested with the process influencing on selecting tree species in urban fabric.

2.5 Factors of Urban Tree Growth

Some authors have been carried out to understand and explore the possible value of genetic control of plants for agriculture improvement and landscape design (Myralyn et al., 2014; Antoine et al., 2011 and Alejandro et al., 2008). Environmental factors are considers major control mechanism for urban tree growth. Factors such as water, extreme temperature and wind, poor soil condition, nutrient content and related factors that influence physiological processes such as photosynthesis and respiration all contribute are greatly to the growth of urban tree needs (Han et al., 2008 and Antony, 2000). According to James (2014), there are three aspects of tree growth and development that are associated with a time; juvenility and maturity, existing structure and ageing. In the plant's community, several classes' chemicals have been separated and identified. These chemicals are referred as plant growth regulators or hormones reputed to plant development control (George, 2012).

Table 2: Factors of Tree Growth

Factors	Items
Genetic controls	Pets and environmental tolerance, tree life story, tree life span, compartmentalization response and production of allopathic chemical
Environmental control	Water, sunlight, wind, moisture, temperature, soil condition and nutrient content
Time	Maturity period
Plant growth regulations	Auxin, Cytokine, abscisic acid, gibberellins and ethylene

(Source: Jasasikin, 2015)

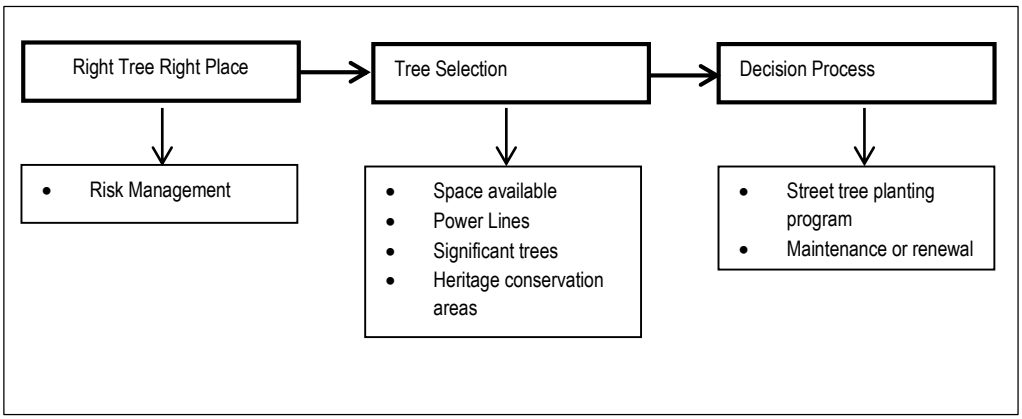
2.6 Role of Landscape Architects in Malaysia

According to Official Website of Institute of Landscape Architects Malaysia (ILAM), landscape architects have often been the unsung heroes of Malaysia's landscape development projects. These passionate individuals work tirelessly to balance the needs of the environment alongside the construction of physical features such as buildings and public spaces. Landscape Architecture Agenda 2050 (LAA2050)was introduced by president ILAM 2016-2018 comprising vision and 10 Strategic Focus Areas (SFA) required to drive the landscape architecture professional forwards. This study related to strategic focus area on SFA 02 and SF08 are Resource Management and Best Practices. In others word, Landscape Architects should safeguard and incorporate effective resource management in each design approach and should increase productivity through an organized structure which promotes high efficiency, enhanced best practice standards and quality control in delivering the services. Related to this study, landscape Architect should have implements the best practices and works proactively in deciding on the process of selecting tree species. The experts on trees species with knowledgeable and experience should be given priority during the decision-making stage. They also needed a good resource as guidance for right species in the right place.

2.7 Tree Selection Process in Other Countries

Tree selection process under Newcastle City Council Street will address the risk implication from planting, by ensuring that the space a tree is planted into can support the tree at maturity and reduce the risk of failure in storm events. The processes of selection street tree species are divided into three stages which are right tree right place, tree selection and decision process (Figure 1).

Figure 1: Example of tree selection process in other countries

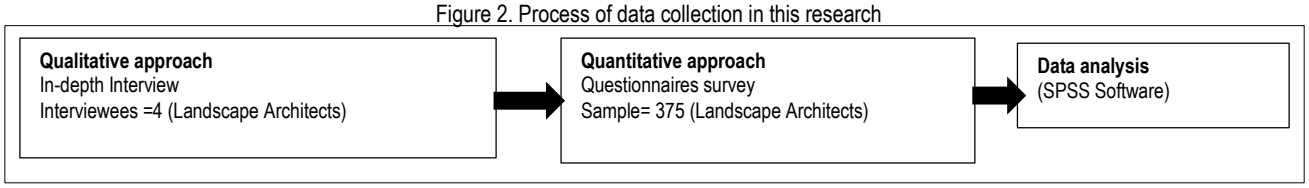


The Street Tree Master Plans in Newcastle City Council commonly take a prescriptive approach to species selection. This Master Plan adopt a different approach that begins with an analysis of site constraints risks, design opportunities and species characteristics as key considerations before determining a short list of sustainable species. Compared to City of Sydney Street Tree Master Plan 2011 indicate three main categories in tree selection process which are environmental tolerances, functional requirements and aesthetic and design requirements. Consideration of the criteria should ensure the selection of tree species with the most desirable and appropriate characteristics. Aesthetics and design considerations will be accommodated only where optimum conditions for plant growth are available. The proven performance of the species in particular environmental conditions and functional requirements will be the prime considerations for street selection. Furthermore, Marrickville Council in west Sydney introduced Street Tree Master Plan 2014 and implementing the relevant tree species and planting guide included in this Plan. Selection the tree species for planting depending on their suitability for specified street, aesthetic, functional and biologic attributes, past performance and the potential to contribute to the wider environment, using the philosophy of the ' right tree for the right location'. In addition, should consider the known pest and disease impacts when selecting new tree species and managing tree replacements.

3.0 Methodology

This study used mixed method approach which based on analysis of qualitative and quantitative data collection. The purpose of the qualitative approach is for in-depth interviews conducted with a senior landscape architect in the local authority. Secondly, are using literature reviews. A critical literature review was conducted on theories related to tree species selection and factors are influencing in selecting tree species were studied. For quantitative approach researchers used questionnaire survey and analyzed in SPSS software to test the relationship between process considerations and factors influencing in selecting tree species. Because of data are non-parametric, Kendall tau-b are used to test the correlations. For the quantitative approach, 375 of the landscape architects were select for answered the questionnaire survey. The method used is descriptive analysis, one way ANOVA and Correlation test. The selections of the respondents for in-depth interview are one senior Landscape Architect based on experience and knowledgeable in selecting tree species at Kuala Lumpur City Hall, Petaling Jaya City Council, Selayang Municipal Council and Subang Jaya Municipal Council. The selection of local authority is based on their promise to share information with researchers. The main questions were asked *'what is the process consideration during selecting tree species in urban area?* All the important process is described using coding technique. Figure 2 showed the process of collecting data in this study.

Figure 2. Process of data collection in this research



4.0 Findings

4.1 In-depth interview results with landscape architects in government agency

In-depth interviews were conducted with practitioners from four Malaysian local authorities during 2017. The justification of the selection landscape architects in local authority because they have the authority to approve the proposed of tree species at roadside areas. In general, the interviews lasted about an hour to an hour and a half. During the interviews the respondents were asked the same questions set in the same order. The answers were open-ended and provided opportunities to give their comments of which some were further questioned and considered. The selections of the landscape architects are based on the knowledge and experiences in handling the selection roadside trees. Two male and two female are selected from different authority to see the different view of how the street trees twere selected. Interviewees at City Councils had more than ten years of work experience and interviewees from Municipal Councils had less than ten years' experience. Two City Councils; Kuala Lumpur City Hall and Petaling Jaya City Council and two Municipal Councils; Subang Jaya Municipal Council and Selayang Municipal Council were selected to catch the similarities and differences in selected roadside trees. From the data interviews, researchers were analyzing the data and make it in seven processes of selection tree species. The results are according to the selection process addressed in table 2. Example of the quote from the respondents such

as: The first code 'framework and plan' was addressed by half the interviewees. The following quote of the respondent describes this code best:

"Due to the increasing number of problem trees occurs in roadside at Kuala Lumpur, we have gone through a process to develop a set of Street Tree Management Plan for long-term management of urban trees" .

Tree species selection is guided by Street Management Plan. Attract to this plan is a tree species list for each area. Most of the area has been planted along the lines of the plan. However, in some areas, as explained by the interviewee, the street trees plantings differ from the proposed plan due to variation at the actual planting location.

"Tree species are more selected to do with the character. Obviously in near line with current tree planting and that effect what tree species we select. If we have a dominant tree species in a linear street, we would continue that."

"...Certain landscape architects defined our street in main streets, highway, roundabout, secondary roads, protocol roads and back lane. However they did identify the suitable type of trees that could be appropriate for planting in those streets..."

The codes of 'themes' mentioned by two interviewees. Theme was explained as characteristics of a street. Common themes are based on historical development of street, closeness to building facade and facilities such as Monorail station and construction areas. Theme also reflects the hierarchy of roads in urban area such as protocol roads, primary roads, secondary roads, highway and main roads.

"..Starting in1990's, mostly in the roadside area is planted with Khaya senegalensis, the trend change planted with flowering trees such as Tabebuia rosea and Pelthoporum ptrecocarpum and next is Terminalia mentaly..The trending of selection roadside tree nowadays is to maintain the identity of the roads through planted flowering tree and concern on interesting shapes of tree."

All interviewees mentioned that the tree species were selected based on the current 'trending'. The trending is follow based on the aesthetical value such as flowering tree (*Tabebuaia rosea*) and have a beautiful shape (*Terminalia mentaly*).

All interviewees describe this code best:
"…we refer to National Landscape Guidelines in selecting roadside tree species and some guidelines as reference in maintaining the trees. However, we need to make their own decision because the guideline is not detail and incomplete."

Under the code of 'landscape policies', all interviewees explained the guidance in selecting roadside tree species. Majority of the respondent used the National Landscape Guidelines as their reference for selecting and maintaining the roadside trees. However, the interviewees inform that they have their own guideline to select the roadside trees.

The best code from each interviewee as follows:
"Our budget (financial) for street tree planting is not huge and that's another factor in tree selection."

The next code is the availability of 'budget constraint'. The budget provided by the respective council and defines the number of possible tree plantings in the financial year. Two interviewees highlight the budget in term of selection street tree planting.

The best code from each interviewee as follows:
"Tree species are more selected to do with the character. Obviously in near-line with current tree planting and that effect what tree species we select. If we have a dominant tree species in a linear street we will continue that."

The codes of 'limiting factors' are described by three interviewees. The tree species according to environmental constraint and cultural constraint was mainly influenced by limiting factors. Miller (1997) defined of limiting factors are a group of environmental and cultural constraint and all these limiting factors were mentioned during the interviews. Interviewees determine the survival of a street trees species in urban areas.

Table 2. Important codes of process consideration during selecting street tree species are listing during interviews session

No	Code of process consideration	Explanation	Total response
1	Framework and plan	Basic supporting structure or rules in selected roadside tree	2
2	Trending	Change or develop in selected tree species	4
3	Landscape policies	The principle of action by National Landscape Department such as blueprint, approach and guidelines in propose roadside tree	4
4	Personal preferences	A person who can make the decision making	4
5	Limiting factors	Environmental conditions that limit the roadside tree growth	3
6	Themes	Describes the characteristics of a street need a match with suitable trees species	2
7	Budget constraint	Cost barrier for purchase and maintenance part of roadside trees	3

4.2 Questionnaires Survey results

4.2.1 Frequency of Socio-Demographic Characteristics

Table 3. Frequency of Socio Demographic Characteristics

No	Socio Demographic characteristics	Frequency, F (n=375)	Percent ,%
1	**Types of organizations**		
	Landscape consultants	128	34.1
	Landscape contractors	96	25.6
	Landscape developers	64	17.1
	Government agency	87	23.2
2	**Genders**		
	Male	209	55.7
	Female	166	44.3
3	**Race**		
	Malay	281	74.9
	Chinese	43	11.5
	Indian	51	13.6
4	**Age (years)**		
	30 and less	52	13.9
	31 - 40	98	26.1
	41 –50	126	33.6
	51 –60	95	25.3
	60 and above	4	1.1
5	**Qualification level**		
	Bachelor Degree	223	59.5
	Master	144	38.4
	PhD	8	2.1

Table 3 indicates the frequency of socio-demographic characteristics of the respondents. The information on socio-demographic character was gathered from section A of the questionnaire survey. In the findings, it revealed that 4 types of organization of landscape architects which are landscape consultants (34.1%), landscape contractors (25.6%), landscape developer (17.1%), and government agency (23.2%). In general, races are categorized into 3 groups which are Malay (74.9%), Chinese (11.5%) and Indian (13.6 %). Regarding distribution of respondents based on genders, (55.7%) of respondents are male and (44.3%) are female. Most respondents were recorded to be in the range 51 – 60 years (33.6%) and the highest qualifications of the respondents are Bachelor degree level (59.5%).

4.2.2 Ranking of mean analysis of process influencing in street tree selection

Table 4 shows the ranking of mean for the process influencing street tree selection. The analysis shows the most influential factor based on the ranking of mean trending (mean = 4.70, rank 1). The second influential street tree selection is landscape policies (mean = 4.50, rank 2). The third influential selection of street trees is personal preference (mean = 4.41, rank 3), followed by budget constraint (mean = 4.11, rank 4). Next is limiting factor (mean = 4.08, rank 5). This is followed by framework and plan (mean = 3.94, rank 6) and lastly is themes (mean = 3.82, rank 7).

Table 4. Mean analysis for Process Influencing on Selecting Street Tree Selection

Process	Mean	Std. Deviation	Rank
Trending	4.70	0.50	1
Landscape policies	4.50	0.71	2
Personal preference	4.41	0.75	3
Budget constraint	4.11	0.78	4
Limiting factor	4.08	1.11	5
Framework and plan	3.94	1.39	6
Themes	3.82	0.84	7

Note : Likert Rating Scale: 1-Strongly disagree, 2-Disagree, 3- Moderate, 4-Agree, 5- Strongly agree

4.2.3 Mean comparison between types of organization with process consideration in selecting tree species using One –Way ANOVA

Table 5 showed the mean comparison between tree selection process and organization of respondents. There are six criteria of tree selection process that shows highly significant differences ($p<0.01$) which are trending, landscape policies, personal preference, budget constraint, framework and plan and lastly are themes. For landscape policies ($F=4.61$, $p<0.04$), the result revealed that the significant different was at $p<0.05$.

Table 5. Mean Comparison between type of organization and tree selection process

Type of organizations / Tree selection process	Landscape consultants (N = 128)	Landscape developers (N = 64)	Government agency (N = 87)	Landscape contractors (N = 96)	F	Sig.
Trending	4.85	4.75	4.15	4.77	21.2	0.00**
Landscape policies	4.46	4.79	4.39	4.45	4.61	0.04
Personal preference	4.17	4.64	4.54	4.48	7.84	0.00**

Budget constraints	4.15	4.45	3.45	3.96	6.61	0.00**
Limiting factor	3.84	4.32	4.27	4.07	3.93	0.09
Framework and plan	4.26	3.78	3.79	3.89	9.58	0.00**
Themes	4.15	3.31	3.95	3.62	19.35	0.00**

Note: Likert Rating Scale: 1-Strongly disagree, 2-Disagree, 3- Moderate, 4-Agree, 5- Strongly agree
*Significant differences at p<0.05
**Highly significant differences at p<0.01

4.2.4 Mean comparison between types of organization with environmental constraints in selecting tree species using One – Way ANOVA

Table 6 shows the mean comparison between criteria of environmental constraints and organization of respondents. There are four criteria of tree selection process that shows highly significant differences (p<0.01 which are climatic, edaphic, physiographic and biologic. For climatic, the landscape architects in landscape contractors firm rated higher than other organizations. For edaphic, the landscape architects in government agency, rated the highest but they rated lowest for the biologic factors.

Table 6. Mean Comparison between the type of organization and environmental constraints

Type of organizations Criteria	Landscape consultants (N = 128)	Landscape developers (N = 64)	Government agency (N = 87)	Landscape contractors (N = 96)	F	Sig.
Climatic	4.54	4.50	4.03	4.64	15.43	0.00**
Edaphic	4.22	4.26	4.62	4.29	5.87	0.00**
Physiographic	4.52	4.30	4.54	4.04	11.31	0.00**
Biologic	4.35	4.51	3.95	4.43	7.37	0.00**

Note: Likert Rating Scale: 1-Strongly disagree, 2-Disagree, 3- Moderate, 4-Agree, 5- Strongly agree
*Significant differences at p<0.05
**Highly significant differences at p<0.01

4.2.5 Relationship between environmental constraints against tree selection process using Correlation Coefficient

Table 7 elaborated the results of the correlation test using Kendall's tau for environmental constraint against the important process consideration in selecting tree species. Overall, the values of the correlation coefficient are positive. Criteria for climatic against framework and plan indicates significant different, low correlation and weak relationship (tau=0.362*, p<0.01) followed by biologic criteria's showed moderate correlation and substantial relationship between framework and plan (tau=0.589**, p<0.01). For edaphic criteria's showed the slight correlation and no relationship (tau=0.095**, p<0.05). However, no significance difference between physiographic with framework and plan (tau=0.223, p <0.01).Meanwhile, criteria for biologic against trending showed high correlation and marked relationship (tau=0.782**, p<0.01). Two negative correlations showed slight correlation and no relationship which are edaphic and physiographic against trending (tau = -0.060, p<0.05) and (tau= -0.053, p<0.05). Criteria for climatic showed the moderate correlation and substantial relationship between trending (tau = 0.589*, p<0.01). Criteria for climatic and biologic against landscape policies showed moderate correlation and substantial relationship (tau = 0.413*, p<0.01) and (tau = 0.513**, p<0.01). Criteria for edaphic and physiographic showed the slight correlation and no relationship between landscape policies (tau = 0.019, p<0.05) and (tau=0.052**, p<0.05). Furthermore, the correlation coefficient values between edaphic and showed substantial relationship, meaning that a moderate correlation likely occurred in the personal preferences (tau=0.467**, p<0.01) and (tau =0.603*, p<0.01). Criteria for climatic showed the low correlation and weak relationship between personal preferences (tau=0.209, p<0.01) and followed by biologic criteria's showed slight correlation and no relationship between personal preferences (tau=0.177, p<0.01). Two criteria of environmental constraint showed the low correlation and weak relationship which are climatic and edaphic against limiting factors (tau=0.310**, p<0.01) and (tau = 0.267**, p<0.01). Criteria for physiographic showed the high correlation and marked the relationship between limiting factors (tau=0.702**, p<0.01). However, no significant difference, slight correlation and no relationship between biologic and limiting factors (tau=0.099, p<0.05). All criteria of environmental constraints indicate the significance different between themes. Criteria for climatic and physiographic showed the low correlation and weak relationship between themes (tau =0.377*, p<0.01) and (tau = 0.288**, p<0.01).For biologic against themes showed moderate correlation and substantial relationship (0.642**, p<0.01) followed by criteria for edaphic against themes showed the slight correlation and no relationship (0.153**, p<0.01). Criteria for climatic and physiographic showed the moderate correlation and substantial relationship between budget constraint (tau =0.617*, p<0.00) and (tau = 0.538**, p<0.00).For biologic against budget, constraint showed low correlation and weak relationship (0.244, p<0.01) followed by criteria for edaphic against budget constraint showed the slight correlation and no relationship (0.129, p<0.01).

Table 7. Kendall tau-b correlation between criteria of environmental constraints and tree selection process

Criteria of environmental constraints Tree selection process	Climatic	Edaphic	Physiographic	Biologic
Trending	0.589*	-0.060	-0.053	0.782**
Landscape policies	0.413*	0.019	0.052**	0.513**
Personal preference	0.209	0.467**	0.603*	0.177
Budget constraints	0.617*	0.129	0.538**	0.244
Limiting factor	0.310**	0.267**	0.702**	0.099

Framework and plan	0.362*	0.095**	0.223	0.589**
Themes	0.377*	0.153**	0.288**	0.642**

Note:
The correlation coefficient is calculated using Kendall's tau -b
** Correlation is high significant at the level 0.01 (2-tailed)
*Correlation is significant at the level 0.05 (2-tailed)

Value of Correlation coefficient	Interpretation	Type of Relationship
0.90 – 1.00	Very high positive (negative) correlation	Very strong relationship
0.70 – 0.90	High positive (negative) correlation	Marked relationship
0.40 – 0.70	Moderate positive (negative) correlation	Substantial relationship
0.20 – 0.40	Low positive (negative) correlation	Weak relationship
Less than 0.20	Slight correlation	Relationship so small as to be negligible

(Source: Burns, 2000; Hinkle, 2002 Mukaka, 2012)

5.0 Discussions

The findings for tree selection processes in Malaysia are based on four types of organizations which are landscape consultants, landscape developers, landscape contractors and government agency. Interviews results indicate seven tree species process are based on trending, landscape policies, personal preference, budget constraints, limiting factors, framework and plan and themes. The roles of landscape architects create the landscape and plan, design and manage the spaces including natural and built environment in creating urban fabric. Supported by previous research, Sheppard (2015) stated that landscape architects could play an integrative and visionary role in creative design and engagement of communities on climate change. Their work provides innovative and aesthetically pleasing environments for people to enjoy while ensuring that changes to the better environment are appropriate, sensitive and sustainable. The implementation of best practices in tree selection process and proper tree management will achieve the goal of two Strategic Focus Areas (SFA) in Landscape Architecture Agenda 2050 (LAA2050) which are Resource Management (SF02) and Best Practices (SF08). Overall, the findings of the research will contribute to the knowledge in tree selection process among landscape architects.

6.0 Conclusion

Choosing right tree species in the right place are pertinent part of creating urban fabric. Choosing optimal and suitable trees in the urban fabric can minimize the negative influence and increase the positive effects. Landscape architects have been created a healthy environment through appropriate tree selection. The proper tree selection process are an important part in determine the suitable tree species. Environmental constraints were introduced by Miller Model are helped in determining the relationship with tree selection process.

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