



Conceptual Framework for Developing a Model of Effective Tree Preservation Order (Act 172) Implementation in Construction Projects

Nik Adlin Nik Mohamed Sukri¹, Zulhabri Ismail^{1*}, Wan Tarmeze Wan Ariffin²

¹Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Malaysia

²Forest Research Institute Malaysia (FRIM), 52109 Kepong, Malaysia

*Corresponding Author

DOI: <https://doi.org/10.30880/ijscet.2020.11.01.003>

Received 30 September 2019; Accepted 27 Mac 2020; Available online 23 April 2020

Abstract: Trees are important to human and the environment, and they must be preserved for the benefit of mankind. The Government of Malaysia has realized that the country's rapid development is killing the trees especially due to construction activities. On that basis, the Tree Preservation Order (TPO) (Act 172) was introduced in 1996. However, from time to time, there were cases whereby the trees that were supposed to be preserved have been cut down for development without consent of the local authorities. This situation has raised questions about the effectiveness of implementing TPOs, especially pertaining to construction projects. Hence, this conceptual paper proposes a framework for the development of effective TPO implementation model in construction projects. It consists of four key components that must be taken into account to ensure better implementation. The formation of this conceptual framework was based on facts and knowledge obtained through literature review and document analysis.

Keywords: Act 172, construction project, effective implementation, Tree Preservation Order (TPO)

1. Introduction

As with most countries in Southeast Asia, Malaysia is going through rapid urbanization, wherein as estimated by the United Nation (UN, 2016), 80.1% or about 28 million of Malaysians will be residing in urban areas by 2025. Urbanization, or an increase in the proportion of population living in towns and cities, could create many problems if not properly managed. High population density, lack of job, disease, inadequate infrastructure, lack of affordable housing, flooding, pollution, threatened biodiversity, creation of slum, crime, congestion, and poverty are among the problems that are associated with urbanization (Okorie, 2015; Reese, 2018).

The 'New Urban Agenda' or NUA (UN, 2017), launched at Habitat III in 2016 represents the shared global visions of governments and municipalities throughout emerging and developing countries. These visions claim that their cities can not only be inclusive and secured, but also resilient and sustainable, and that cities can be a source of solutions to, rather than the cause of, the challenges that the world is facing today. In February 2018, Malaysia hosted the 9th World Urban Forum and the 'Kuala Lumpur Declaration on Cities 2030', a pledge by the participants to localize and scale up the implementation of NUA as an accelerator to achieve the UN Sustainable Development Goals, was launched at the event (UN, 2018).

NUA emphasizes that in order to achieve the goals, the international community should reconsider their urban systems and physical form of their urban spaces. One of the urban spaces mentioned was the public space, which include streets, sidewalks and cycling lanes, squares, waterfront areas, gardens, and parks. The public spaces must be 'green' and of high quality, while made safe, inclusive, accessible by all, and able to enhance social and intergenerational interactions and cultural expressions.

Even though the word 'tree' is not mentioned in the NUA, one can easily agree that trees are essential parts of any public space. Trees offer many environmental and human and social benefits and the list is not exhaustive. They provide oxygen, improve air quality, conserve water, preserve soil, and support wildlife. During the process of photosynthesis, trees take in carbon dioxide and produce oxygen for human beings to breathe. Trees are planted in urban public spaces for its various advantages. However, the trees can only be beneficial when they are healthy and alive. Trees could become sick and hazardous when they are wounded or damaged, thus, they must protected throughout, especially those that can be regulated such as construction activities.

The need to preserve and protect urban trees could become more pertinent for Malaysia due to the rapid development, whereby roads, highways, and train rails are built, extended or diverted, areas are cleared to give way for new buildings, and other construction projects that may irresponsibly demand the cutting down of trees. Understanding this fact, Malaysia has introduced the Tree Preservation Order (TPO) under the Town and Country Planning Act 1976 (Act 172) (Laws of Malaysia, 2006) that would protect the trees that are meant to be preserved from being damaged or killed.

2. Background of The Study

The TPO (Act 172), if properly implemented and enforced, should be sufficient to prevent illegal removal of trees or damage to trees. However, in cases where trees are felled without the local authorities' consent, such as of the Melaka Raya in 2015 and of the Jalan Cochraine in 2016, these events have raised questions whether or not TPO has been effectively implemented (Nik Mohamed Sukri *et al*, 2017).

After more than two decades since its inception, TPO (Act 172) has not made much progress in terms of its implementation and enforcement, and this fact can be comprehended from the findings of studies and remarks by various stakeholders shown in Table 1 [extended from Nik Mohamed Sukri, (2017)].

Table 1 - Research Findings and Remarks on TPO (Act 172) by Various Stakeholders

| No. | Publication | Findings and remarks on TPO (Act 172) |
|-----|---------------------------------------|---|
| 1 | Syed Abdul Kader (2006) | Mocking the TPO (Act 172) as 'teeth without the bite'. |
| 2 | CIDB (2007) | Dissatisfied with the lack of TPO (Act 172) implementation by local authorities and recommended that the State Government and the Ministry of Housing and Local Government work towards increasing the awareness and enforcement among local authorities regarding the TPO (Act 172). |
| 3 | Roslan (2011) | Lack of TPO (Act 172) implementation within the KL City Hall. |
| 4 | Abdul Aziz <i>et al</i> (2011) | Questioning the knowledge of TPO (Act 172) among green space municipal officers. |
| 5 | Bernama (2014) | Tun Jeanne Abdullah, the chairman of Landskap Malaysia, urges the authorities to enhance the implementation of TPO (Act 172), forcing the developers to replace the trees that were cut down for development projects. |
| 6 | Mohd Hashim & Hitchmough (2015) | Lack of knowledge on tree root system and structure among landscape architects. |
| 7 | Hasan <i>et al</i> (2016) | 80% of the respondents considered that the TPO was not fully utilized during the proposal of landscape design. |
| 8 | Muhammad Aiman (2017) | The implementation of TPO in Malaysia is still weak and there are no specific guidelines on the types of trees and species that must be protected and preserved. |
| 9 | Nik Mohamed Sukri <i>et al</i> (2017) | TPO should be accompanied by efforts to guide the public to understand the legislation requirements so that it can be effectively enforced and complied with. |

- | | | |
|----|---------------------------------------|--|
| 10 | Ibrahim <i>et al</i> (2019) | The local authority faces several issues in implementing the TPO because of the lack of awareness of TPO from the public. |
| 11 | Nik Mohamed Sukri <i>et al</i> (2019) | The government should be more active in publicizing the TPO (Act 172), such as through mass media and awareness campaigns. |
-

All of the findings and remarks above have proven that the implementation of Malaysian TPO (Act 172) is still far from perfect and should be reviewed, re-evaluated, and improved from time to time. These efforts are justified, as some developed countries have been constantly practising this method to guarantee that its purpose of greening the country is achieved (Nik Mohamed Sukri, 2017). With the current rapid pace of development, in which the construction project activities could cause tree damages and death, the Malaysian TPO (Act 172) needs to be effectively implemented to continue and further protect the trees.

Thus, this paper intends to propose a conceptual framework to be used as the platform for future research to develop a model of effective implementation for Tree Preservation Order (Act 172) in construction projects. Subsequently, the next section will elaborate on the literature review, methodology, findings, the proposed conceptual framework, and direction for future study.

3. Literature Review

The purpose of literature review is to provide better understanding on the management-related subjects that are pertinent to this study: 1) Effective implementation; 2) Legislation key components; and 3) Critical success factors.

3.1 Effective Implementation

Implementation is the process that turns plan, which can be in the form of a policy or legislation, into actions in order to accomplish strategic objectives. A policy, legislation and a regulation alike, can be simply considered to have been effectively implemented when it produces the results that were intended in practice (Ugwuanyi & Chukwuemeka, 2013). However, effective implementation is not an easy process and it has caused many policies to fail. A study by the World Bank indicates that policy failure happens between 25% and 50% of the time (Andrews, 2018). Researches have been conducted to determine solutions to effective implementation of programs, policies and regulations. Among the solutions suggested were: to include all actions necessary to ensure strict and reliable enforcement of the provisions (Clark, 2004), all involved parties to resolve their differences within the shared goals while putting policy into action (Tsendjav, 2011), and to allow active participation of affected communities in the policy formation (Russel, 2015). In the context of TPO (Act 172), it is considered to have been implemented only when an order, normally in the form of a public notice (TPO Notice), is initiated by a local planning authority (LPA) to preserve a tree or a group of trees. Moreover, TPO (Act 172) implementation is deemed more effective if the intended number of preserved trees remains longer.

3.2 Legislation Key Components

In order to better comprehend the fundamentals of the implementation of legislation, the key components of legislation representing the most important issues that should be adequately addressed in the legislation (WHO, 2013) must be identified. This prerequisite can be achieved by reviewing the content of the legislation (Tang *et al*, 2011) and understanding, among others, why the legislation was introduced, what are the subject matters to be regulated, and who the stakeholders are.

3.3 Critical Success Factors

Critical Success Factors (CSFs), defined as parameters that determine the success or failure for a business unit or organization, was a concept developed and introduced by D. Ronald Daniel, on behalf of McKinsey & Co, in 1961. A decade later, the concept was refined and popularised by John F. Rockart. Since then, the concept has been widely applied to guide organisations in developing and implementing strategies and projects (Amberg *et al*, 2005). Known as a tool for measuring performance in an organisation to achieve their mission (Zawawi *et al*, 2011), CSFs represent the areas that the management must carefully consider in order to bring about continued good performance. CSFs are essential for the success of any program, in the sense that if the objectives associated with the factors are not achieved, the program will, perhaps, be deemed to have failed catastrophically (Rungasamy *et al*, 2002). The concept of CSFs offers a smarter way to identify certain factors (Alzahrani & Emsley, 2013), which when well dealt with in a project, are likely to make a project successful. There have been many studies accomplished to explore CSFs of programs in various industries, such as construction (Al Haadir & Panuwatwanich, 2011; Gudiene *et al*, 2013; Yu *et al*, 2018), information technology (Alreemy *et al*, 2016) and sustainable housing (Oyebanji *et al*, 2017; Adabre & Chan, 2019).

4. Research Methodology

In this present effort to provide the framework of effective TPO implementation in construction project, it is important to know whether or not there has been any previous study on the above-mentioned subjects done specifically for TPO. Thus, a research approach containing the following methods was opted: 1) Systematic literature review; 2) Document analysis; and 3) Experts consultation.

4.1 Systematic Literature Review

Systematic literature reviews (SLRs) are a type of scientific research that has the purpose of objectively and systematically integrating the results of empirical studies on a certain research problem, with the intention of determining the state of the art in a specific field of study.

A systematic literature review seeks to evaluate the state of the literature on a specific topic or research question (RQ). It is a structured approach to research synthesis, following a number of pre-determined steps (e.g., Boland *et al.*, 2017; Gough *et al.*, 2017; Higgins & Green, 2008). The first step to conducting a systematic literature review is determining a specific and clearly delineated RQ to be answered. It is important that this RQ is posed in the form of a question or hypothesis that can be answered through a comparison of relevant studies.

In this current study, in order to retrieve the related scientific research papers, a comprehensive search was conducted through three common databases: Science Direct, Web of Science and Scopus. Main keywords used for searching were “effective implementation”, “key components” and “critical success factors”, each of them was combined together (by using Boolean Operator ‘AND’) with “Tree Preservation Order” or “Tree Preservation Ordinance”. Secondary keywords were “implementation” and “key factor”, where each of them was also combined with “Tree Preservation Order” or “Tree Preservation Ordinance”.

4.2 Document Analysis

Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic. Analyzing documents incorporates coding content into themes similar to how focus group or interview transcripts are analyzed (Bowen, 2009). A rubric can also be used to grade or score a document. There are three primary types of documents (O’Leary, 2014):

- Public records: The official, ongoing records of an organization’s activities. Examples include student transcripts, mission statements, annual reports, policy manuals, student handbooks, strategic plans, and syllabi.
- Personal documents: First-person accounts of an individual’s actions, experiences, and beliefs. Examples include calendars, e-mails, scrapbooks, blogs, Facebook posts, duty logs, incident reports, reflections/journals, and newspapers.
- Physical evidence: Physical objects found within the study setting (often called artifacts). Examples include flyers, posters, agendas, handbooks, and training materials.

The documents related to TPO (Act 172) were acquired from the agency responsible for the legislation, i.e., the Federal Department of Town and Country Planning, Peninsular Malaysia or *Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia* (JPBD) (also known as ‘PLANMalaysia’, new name approved by the Cabinet Meeting of 25 January 2017) and its departments at state level. The complete document selection was made possible through consultation with two officers in PLANMalaysia who have working experience on TPO (Act 172).

4.3 Expert Consultation

A consultation with an experts or other experienced professionals involve meeting or communication to discuss a particular problem. In this study, the two experts are officers working with PLANMalaysia whose profiles are shown in the Table 2 below. They were frequently contacted through phone calls and e-mails, and sometimes, from a face-to-face communication to get clarification on matters written in the documents.

Table 2 - Biodata of the TPO-related Experts Consulted in the Study

| No | Data | Expert #1 | Expert #2 |
|----|------------------------|--|--|
| 1 | Position | Senior Assistant Director National Physical Planning Div. | Town & Country Planning Officer Legal and Regulatory Division |
| 2 | Academic Qualification | Master Landscape Architecture | Bachelor Urban & Regional Planning |
| 3 | Work Experience* | PLANMalaysia, JPBD Selangor, | PLANMalaysia, Universiti Teknologi Malaysia (UTM) |

Jabatan Landskap Negara [National Landscape Department] (JLN),
Majlis Perbandaran Selayang [Selayang Municipal Council] (MPS),
 Langkawi Development Authority

| | | | |
|---|----------------------------------|---|---------------------------|
| 4 | TPO (Act 172) related Experience | Publication of TPO (Act 172) Guidelines | TPO (Act 172) Legislative |
|---|----------------------------------|---|---------------------------|

Note: * in descending chronological order.

5. Results and Discussion

5.1 Literature Review

The results and findings of the literature retrieval and review, respectively, are shown in Table 3. The findings reveal that there lack of previous research conducted to propose a model of effective implementation of Tree Preservation Order (Act 172), let alone that was made specifically for construction projects. Nevertheless, some information in the papers can be used by the current study to suggest CSFs, such as ‘better awareness’, ‘more TPO knowledge’ (Hasan *et al*, 2016) and ‘greater public and private sector involvement’ (Wan Ali *et al*, 2016). Owing to the fact that Lavy & Hagelman (2019) have emphasized on the importance of protecting preserved trees, it can be concluded that the enforcement plan is a key component of TPO implementation because only through reliable enforcement could the preserved trees be protected.

Table 3 – Literature Search Results and Findings

| No | Keywords | Results | Authors | Findings |
|----|--|---------|---|--|
| 1 | “effective implementation” AND “Tree Preservation Order” | 1 | Maidin & Salahul Ahamed (2012) | Effective implementation is of Health Impact Analysis, not of Tree Preservation Order |
| 2 | “key components” AND “Tree Preservation Order” | 0 | - | - |
| 3 | “critical success factors” AND “Tree Preservation Order” | 0 | - | - |
| 4 | “implementation” AND “Tree Preservation Order” | 3 | Schmied & Pillmann (2003), Hasan <i>et al</i> (2016) and Kanniah (2017) | Only Hasan <i>et al</i> is fully about TPO implementation , which it considers weak and not fully practiced. The paper mentions ‘better awareness’, ‘more TPO knowledge’, ‘preserved tree list of various categories’, ‘greater commitment from stakeholders’, and ‘standard TPO guidelines’, all of which could be considered as critical success factors. |
| 5 | “key factor” AND “Tree Preservation Order” | 1 | Wan Ali <i>et al</i> (2016) | The literature review mentions that the involvement of private sector and citizens is regarded as a key factor for effective tree conservation and management programs. |
| 6 | “effective implementation” AND “Tree Preservation Ordinance” | 0 | - | - |

| | | | | |
|----|--|---|---|---|
| 7 | “key components” AND “Tree Preservation Ordinance” | 1 | Lavy & Hagelman (2019) | Key components of TPOs related to the parameters, extent and conditions of tree protections are documented and summarized. |
| 8 | “critical success factors” AND “Tree Preservation Ordinance” | 0 | - | - |
| 9 | “implementation” AND “Tree Preservation Ordinance” | 2 | Niell <i>et al</i> (2007) and Hilbert <i>et al</i> (2019) | Niell <i>et al</i> is not about TPO. Hilbert <i>et al</i> is a study on the relationship between urban tree coverage (UTC) and governance (including TPO) across different cities in Florida. |
| 10 | “key factor” AND “Tree Preservation Ordinance” | 0 | - | - |

5.2 Documents Analysis and Expert Consultation

There were numerous documents that contain TPO facts and information in PLANMalaysia. However, below are the important documents as recommended by the two experts:

- 1) Act 172 - Town and Country Planning Act (Laws of Malaysia, 2006);
- 2) *Garis Panduan Perintah Pemeliharaan Pokok (Akta 172)* [Guidelines of TPO (Act 172)] (JPBD Semenanjung Malaysia, 1998);
- 3) PPA 06 *Panduan Pelaksanaan Akta 172 - Perintah Pemeliharaan Pokok* [Guidelines of TPO (Act 172) Implementation] (JPBD Semenanjung Malaysia, 2011); and
- 4) Tree Preservation Order Rules - State Gazettes [Selangor (2001), Perak (2011) & Melaka (2017)].

With the aim of getting a solid grasp on the implementation flow aspects and legislation key components associated with TPO (Act 172), the documents were thoroughly read and with the expert consultation to confirm, the findings of the document analysis are presented in Table 4.

Table 4 – Literature Search Results and Findings

| No | Document | Facts and Information related to: | | Proposed Key Components |
|----|--|--|--|-------------------------|
| | | Implementation Flow | Activities/Actions | |
| 1 | Act 172 (Laws of Malaysia, 2006) | Part I Section 1. (2), (3) | Part II Section 2B. (1) | Publicity |
| | | Part II Section 6. (1), (2) | To make people aware and understand, <i>e.g.</i> , of TPO. (Act 172) | |
| | | Planning Hierarchy Federal ↓ State ↓ LPA ↓ People | Part VA Section 35A. (1) To inform people about a tree (or a group of trees) that has been ordered to be preserved. | Tree List |
| | | | Part VA Section 35E Penalties and appeals for the offences. | Enforcement |
| 2 | Guidelines of TPO (Act 172) (JPBD 1998) | Introduction Planning Hierarchy State ↓ LPA ↓ | 3.2 LPA to have methods to categorize the preserved trees. | Tree List |
| | | | 3.3 | Tree List |

| | | | | |
|---|---|---|--|---|
| | People | | For the purpose of uniformity, the trees to be included in the TPO notice must be from the tree list prepared, approved and produced by the Federal Technical Committees consisting of technical agencies (e.g., JLN, FRIM and PLANMalaysia). | Tree List |
| | | | 4.1 LPA to evaluate the trees in the area before initiating a TPO notice. | Publicity |
| | | | 4.2 LPA to display, in its offices, the maps of preserved trees location for the public to see. | Tree list |
| | | | 4.3. & 4.4 LPA to inform/notify the affected land owners about the preserved tree list. | Enforcement |
| | | | 5.1 LPA to punish/penalize the offences. | Enforcement |
| | | | 6.2 & 6.3 LPA to ensure the requirement of tree re-planting or replacement is obeyed. | Enforcement |
| | | | 7.4 LPA to ensure the general prohibition of tree felling (7.0) is obeyed, i.e., all trees with DBH girth 0.8 m and above are meant for preservation. | |
| 3 | PPA 06 | | Similar to the above Guidelines of TPO (Act 172) | |
| 4 | TPO Rules (State Gazette) Selangor Perak Melaka | Part I Section 1. (1) Planning Hierarchy LPA ↓ People | Forms A and B LPA to use the forms when implementing the TPO (Act 172) in accordance to the 'Guidelines of TPO (Act 172)'. Forms C, E, G, J, K, L, M, and N People to fill in the forms to apply for a tree felling permission (TFP). Forms D, F, H, I LPA to use the forms when responding to tree felling applications. | Standard Operation Procedures (SOPs) for TPO initiation. SOPs for TFP Application. |

The results demonstrate a clear command flow of TPO implementation in the context of Malaysian planning hierarchy, i.e., Federal → State → LPA → People. Act 172, which is the legislation formed at the Federal level, shall come into operation in a State on a date agreed by the State Authority. This act would then be brought into operation at the Local Planning Authority (LPA) level in manners agreed by the State Authority. Finally, the provisions of the act

(such as TPO) will be implemented for the people to oblige. PLANMalaysia is accountable with the tasks to interpret the TPO (Act 172), which is the Part VA Section 35A to 35H, and produce results as reference for those obliged by the legislation, as well as to establish and maintain liaison and cooperation with each of the State authorities in matters related to TPO. Hence, in 1998, PLANMalaysia produced a guideline on TPO (Act 172) and later, formulated a draft of TPO Rules as the basis for the states government to adopt and publish rules of making TPO initiation for LPA to impose on the people. The publication of the state TPO Rules is in the form of a gazette.

After analyzing the activities and actions mentioned in the documents, 4 key components of the TPO (Act 172) implementation are proposed: 1) Publicity; 2) Tree List; 3) SOPs; and 4) Enforcement.

5.2.1 Publicity

It is already a common fact that just like any other legislation, in order for TPO (Act 172) to be effectively and successfully implemented, firstly, its documents must be publicized (DCLG, 2012) and understood by the public and the workforce of the implementation bodies, i.e., the LPAs (Ombudsperson, 2016). Awareness campaigns, public dialogs and in-house trainings are among the methods that can be used to publicize the TPO (Act 172), TPO Guidelines and TPO Rules, as well as all information and actions taken relating to TPO.

5.2.2 Tree List

In TPO (Act 172), trees are the thing or object to be preserved. Lists of trees to be preserved must be made available [also mentioned by Muhammad Aiman (2017)] and readily accessible for LPAs to initiate a TPO. The LPAs should have their own standard procedures of developing and maintaining the tree lists to be accessed by the public and other stakeholders, such as via a web portal.

5.2.3 Planning Permission SOPs

SOPs (e.g., for TPO Initiation by LPA) is another key component of TPO (Act 172) implementation. However, the current SOPs, as have been detailed in the state gazettes, are not adequate to ensure construction projects will make the best efforts not to cut any tree that interferes with their activities. There would be cases where due to the lack of attention given to the existing trees during the project planning (because there is no regulation that requires it to be done), some old, beautiful and large trees have to be felled. Even though the construction project is allowed to apply for TFP, it may not be approved or the compensation may be too high, which would affect the overall cost of the project. This condition may lead to another unwanted consequence, i.e, bribery for approved TFP. To mitigate this risk, LPAs should amend their existing SOPs regarding the approval of development and construction projects (i.e., Planning Permission or PP), such as the Development Proposal and tender document preparation, to include the aspects of TPO. This TPO-integrated SOPs for construction project PP has been practiced by many developed countries, such Australia, United Kingdom, Hong Kong, and Singapore, (AS 4970, 2009; BS 5837, 2012; DEVB TCW, 2015; NParks, 2018), as shown in Table 5. It encompasses all four stages of the construction project.

Table 5 - Summary of TPO-integrated SOPs for Planning Permission

| No. | Construction Project Stage | Requirements of PP | Detail Activities |
|-----|----------------------------|--|--|
| 1 | Planning and Design | 1. Tree Protection Plan (TPP) 2. Arboricultural Impact Assessment (AIA) | Topographical survey, soil assessment, tree survey plan, tree assessment, and Tree Protection Zone (TPZ). |
| 2 | Pre-construction | Tender documents with TPP requirements | Approval by LPAs: TPP, AIA and Certification of tree protection measures. |
| 3 | Construction | Execution of TPP | Activities restricted within the TPZ: Protective fencing, signs, trunk and branch protecting, ground protection, root protection, installing underground services within TPZ, scaffolding, and certification of tree protection. |
| 4 | Post-construction | Evaluation of TPP effectiveness | Tree health assessment, tree vigor and structure, and final certification of tree condition. |

5.2.4 Enforcement Plan

The fourth key component is the enforcement plan. In this final component, the local planning authorities must formulate a plan or policy to enforce TPO and deal with issues, such as unauthorized works on, damage to, or removal of trees that are protected by TPO, and breaches of planning conditions relating to tree preservation and protection (e.g., RBC, 2012; HDC, 2015). In handling tree-related planning breaches, the local authorities must be able to prove that: 1) The defendant has carried out, or caused, or permitted works on the tree; 2) The tree was protected; 3) The tree works were carried out without the authority’s consent; and 4) The works were not exempt works (e.g., ELDC, 2010; BBC, 2018).

6. Proposed Conceptual Framework and Future Study

From the discussions above, a conceptual framework is proposed for developing a model for effective implementation of Tree Preservation Order (Act 172) in construction projects, as in Figure 1. It consists of the four key components that have to be taken care of to ensure the legislation is effectively implemented. In other words, it is critical that certain factors related to the activities/actions within each component (also called as CSFs) are properly planned and executed. For example, in the component ‘① Publicity’, one of the CSFs could be that ‘the awareness campaign must be a continuous effort, not just a one-off’ and ‘awareness among the stakeholders must be kept at maximum level’ (as suggested by Hasan *et al.*, 2016). Referring to Figure 1, the former and latter CSFs could be assigned as CSF1-01 and CSF1-02, respectively.

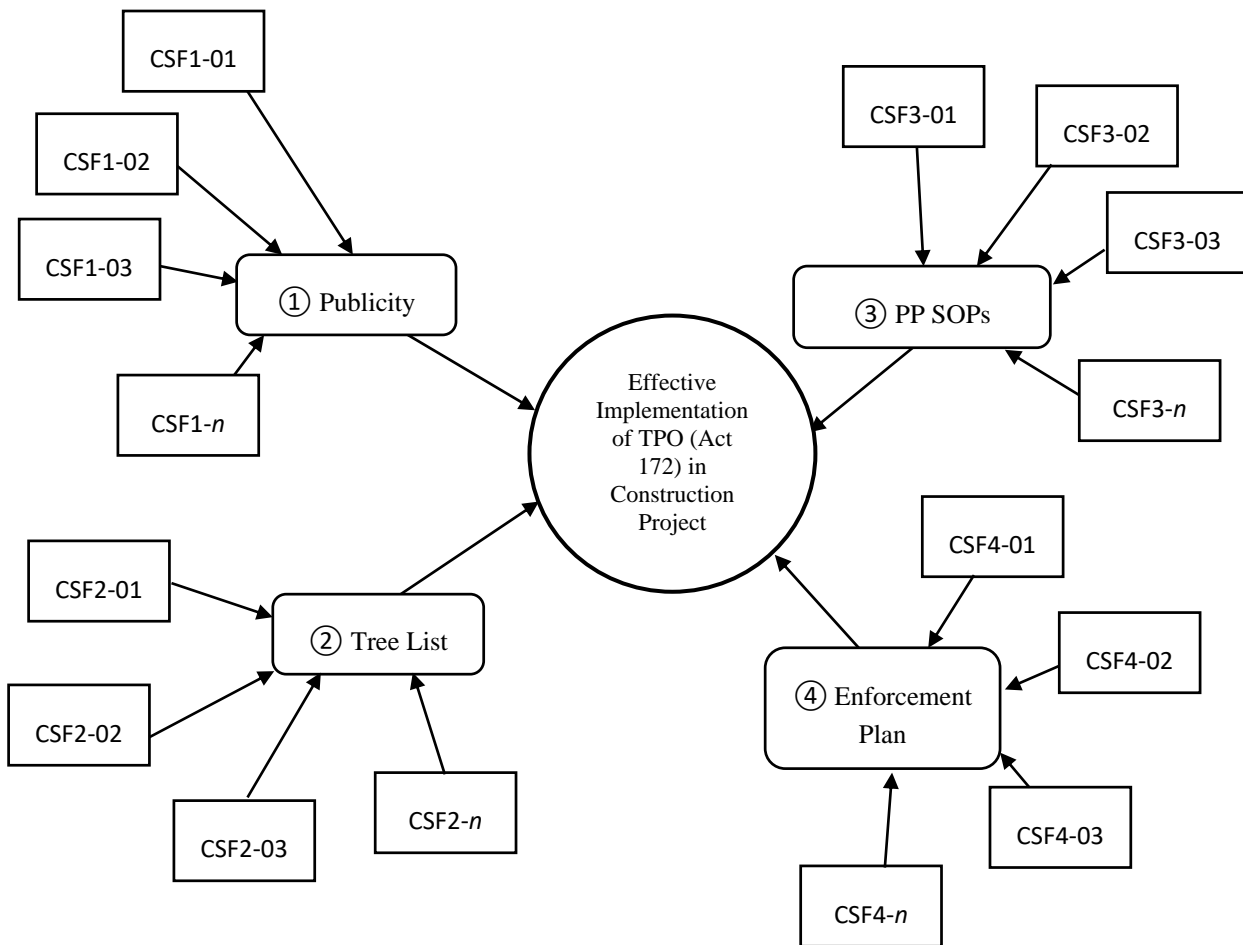


Figure 1 – Conceptual Framework: Effective Implementation of TPO (Act 172) in Construction Projects

Further research is needed for future reference to verify the model development framework when identifying and dealing with more factors critical to the success of TPO implementation. The “Four Key Components Model” will be

presented to selected LPAs, especially city councils in the three states that have gazetted TPO Rules, i.e., Selangor, Perak and Malacca. Interview sessions with officials in the LPAs will then be conducted to gather facts and information on the current state of TPO implementation in each of the key component.

For example, for the first component, the publicity of TPO (Act 172) documents, questions such as “Have your organization publicized the TPO (Act 172)?” would be asked. If the answer is “Yes”, then, the interviewee will be asked to provide the details (e.g., when, by whom, or how) and show the evidence (e.g., leaflets and websites). If the answer is “No”, then, the interviewee will be asked “Why not?” and he/she will be allowed to give his/her opinion on matters concerning the TPO publicity, for instance, who or which agencies are responsible to carry out the publicity tasks.

In addition to the interview, document analysis method will also be applied in the study, especially for the third key component of the TPO model, which is regarding the SOPs related to construction or development projects application and approval. Among the documents pertinent to this future study would be forms and reports prepared for getting approvals for development, such as Draft Local Plan, Development Proposal Report, Layout Plans, and Application for Planning Permission, as stated in the Act 172. All of the facts and information gathered will be analyzed to determine, among others, the CSFs, and the results may be used to propose procedures for effective TPO implementation in construction projects.

7. Conclusion

This paper presents facts that suggest the lack of effective TPO (Act 172) implementation since its inception in 1996, while identifying the construction industry as the main culprit for tree death and damages. Hence, this paper works towards the formation of a framework that enables the development of a Model of Effective TPO (Act 172) Implementation in the Construction Industry. The works were carried out using methods of systematic literature review, document analysis and expert consultation. In the conceptual framework, there are four key components (e.g., publicity, tree list, planning permission SOPs, and enforcement plan) within the TPO (Act 172) that need to be taken care of to ensure that the legislation is effectively implemented in dealing with the construction projects. It is expected that future studies undertaken will look into identifying the critical success factors in each of the key component proposed through this model.

Acknowledgement

The authors would like to express their utmost gratitude to the PLANMalaysia for its technical inputs.

References

- Abdul Aziz, N. A., Konijnendijk, C. C., Sreetheran, M. & Nilsson, K. (2011). Greenspace Planning and Management in Klang Valley, Peninsular Malaysia. *Arboriculture & Urban Forestry* 2011. 37(3): 99–107.
- Adabre, M. A. & Chan, A. P. C. (2019). Critical success factors (CSFs) for sustainable affordable housing. *Building and Environment* 156 (2019) 203–214.
- Al Haadir, S. & Panuwatwanich, K. (2011). Critical Success Factors for Safety Program Implementation among Construction Companies in Saudi Arabia. *Procedia Engineering* 14 (2011) 148–155.
- Alreemy, Z., Chang, V., Walters, R. & Wills, G. (2016). Critical success factors (CSFs) for information technology governance (ITG). *International Journal of Information Management* 36 (2016) 907–916.
- Alzahrani, J. I., Emsley, M. W. (2013). The impact of contractors’ attributes on construction project success: a post construction evaluation. *International Journal of Project Management*, 31 (2): 313–322.
- Amberg, M., Fischl, F. & Wiener, M. (2005). Background of Critical Success Factors Research. Working Paper No. 2/2005. University of Erlangen-Nuremberg. 12 pages.
- Andrews, M. (2018). Public Policy Failure: ‘How Often?’ and ‘What is Failure, Anyway?’ A study of World Bank Project Performance. CID Faculty Working Paper No. 344. Center for International Development at Harvard University. December 2018. 22 pages.
- AS. (2009). Protection of Trees on Development Sites. Australian Standard AS 4970: 2009. 29 pages.

- Bernama. (2014). Jeanne: Ganti Semula Pokok Yang Ditebang (Jeanne: Replace the Felled Trees). 25 June 2014 2:00 pm. A Bernama news published on-line by Malaysiakini portal. <https://www.malaysiakini.com/news/266771>.
- Boland, A., Cherry, M. G. & Dickson, R. (2017). *Doing a Systematic Review*. Sage, London.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.
- BBC. (2018). Brentwood Planning Enforcement Plan. Brentwood Borough Council. December 2018. 28 pages.
- BS. (2012). Trees in Relation to Design, Demolition and Construction – Recommendations. British Standards BS 5837:2012. 50 pages.
- CIDB. (2007). Strategic Recommendations for Improving Environmental Practices in Construction Industry. Lembaga Pembangunan Industri Pembinaan Malaysia. 34 pages.
- Clark, L. S. (2004). The 2001 Cape Town Convention on International Interests in Mobile Equipment and Aircraft Equipment Protocol: Internationalising Asset-Based Financing Principles for the Acquisition of Aircraft and Engines, 69 *J. Air L. & Com.* 3
- DCLG. (2012). Tree Preservation Orders: Proposals for Streamlining. Government response to the consultation. Department for Communities and Local Government. London. March 2012. 9 pages.
- DEVB TCW. (2015). Hong Kong Development Bureau: Technical Circular (Works) No. 7/2015 Tree Preservation. 12 October 2015.
- ELDC. (2010). TP4 Enforcement of Tree Protection. East Lindsey District Council. August 2010. 12 pages.
- Gough, D., Oliver, S. & Thomas, J. (Eds.). (2017). *An Introduction to Systematic Reviews*. Sage, London.
- Government of Malacca Gazette. (2017). Tree Preservation Order (State of Malacca) Rules. Jil. 61 No. 18 Tambahan No. 10, M.P.U.16. 31 Ogos 2017. Percetakan Nasional Malaysia Berhad (PNMB).
- Government of Perak Gazette. (2011). Perak Tree Preservation Order Rules. Jil. 64 Bil. 26 Tambahan No. 21, Pk.P.U.40. 30 Disember 2011. Percetakan Nasional Malaysia Berhad (PNMB).
- Government of Selangor Gazette. (2001). Tree Preservation Order Rules. Jil. 54 No.7 Tambahan No.3, Sel. P.U.8. 29 Mac 2001. Percetakan Nasional Malaysia Berhad (PNMB).
- Gudiene, N., Banaitis, A., Banaitiene, N. & Lopes, J. (2013). Development of a Conceptual Critical Success Factors Model for Construction Projects: a Case of Lithuania. *Procedia Engineering* 57 (2013) 392 – 397.
- HDC. (2015). A Tree Strategy for Huntingdonshire: Tree Policies. Huntingdonshire District Council. February 2015. 15 pages.
- Hasan, R., Othman, N. & Ahmad, R. (2016). Tree Preservation Order and Its Role in Enhancing the Quality of Life. ScienceDirect. *Procedia – Social and Behavioral Sciences* 222. 493-501.
- Higgins, J. P. & Green, S. (Eds.). (2008). *Cochrane Handbook for Systematic Reviews of Interventions*. Wiley, Hoboken, NJ.
- Hilbert, D. R., Koeser, A. K., Roman, L. A., Hamilton, K., Landry, S. M., Hauer, R. J., Campanella, H., McLean, D., Andreu, M. & Perez, H. (2019). Development practices and ordinances predict inter-city variation in Florida urban tree canopy coverage. *Landscape and Urban Planning*, 190, 103603.
- Ibrahim, P. H., Zahrull Pauzi, H. F. & Mohd Masri, N. N. (2019). The Implementation of Tree Preservation Order in Urban Environment: Public and Local Authority Perception. *Journal of Architecture, Planning & Construction Management*, Volume 9 Issue 1, 94-111.
- JPBD Semenanjung Malaysia. (1998). *Garis Panduan Perintah Pemeliharaan Pokok* [Tree Preservation Order Guidelines]. 31 pages.
- JPBD Semenanjung Malaysia. (2011). PPA 06 - *Panduan Pelaksanaan Akta 172: Perintah Pemeliharaan Pokok* [Guidelines of Act 172: Tree Preservation Order]. 24 pages.

- Kanniah, K. D. (2014). Quantifying green cover change for sustainable urban planning: A case of Kuala Lumpur, Malaysia. *Urban Forestry & Urban Greening*, 27, 287-304.
- Lavy, B. L. & Hagelman, R. R. (2019). Protecting the urban forest: Variations in standards and sustainability dimensions of municipal tree preservation ordinances. *Urban Forestry & Urban Greening*, 44, 126394.
- Laws of Malaysia (2006). Town and Country Planning Act 1976 (Act 172). The Commissioner of Law Revision Malaysia. Malaysia: Percetakan Nasional Malaysia Bhd. 132 pages.
- Maidin, A. J. & Salahul Ahamed, N. F. (2012). Mandatory Health Impact Assessment in Malaysian Land Planning and Development Control System. *Procedia - Social and Behavioral Sciences*, 68, 164-172.
- Mohd Hashim, N. H. & Hitchmough, J.D. (2015). The Comparison of Perceptions among Landscape Professionals' on Tree Retention and Legislation. *International Academic Research Journal of Social Science*, 1(2), 164-176.
- Muhammad Aiman, M. R. (2017). Tree Preservation Order at Hutan Bandar Public Park, Johor Bahru.
- Niell, R. S., Brussard, P. S. & Murphy, D. D. (2007). Butterfly community composition and oak woodland vegetation response to rural residential development. *Landscape and Urban Planning*, 81, 235–245.
- Nik Mohamed Sukri, N. A. (2017). Tree Protection in Construction Project Management within Klang Valley. MSc thesis.
- Nik Mohamed Sukri, N. A., Othman, N. & Wan Ariffin, W. T. (2017). A Review on The Needs To Improve Malaysian Tree Preservation Order (TPO) (ACT 172). *PLANNING MALAYSIA: Journal of the Malaysian Institute of Planners*, Vol 15 Issue 4. Pp 105 – 114.
- Nik Mohamed Sukri, N.A., Wan Ariffin, W.T. & Othman, N. (2019). Awareness and Knowledge of TPO (Act 172) Among Local Planning Authority Personnels and Construction Industry Professionals in Klang Valley. *Planning Malaysia: Journal of the Malaysian Institute of Planners*. Vol 17 Issue 2. Pp 267 – 279.
- NParks. (2018). Singapore National Parks Board's (NParks): Guidelines on Greenery Provision and Tree Conservation for Developments. 203 pages.
- O'Leary, Z. (2014). The essential guide to doing your research project (2nd Ed.). Thousand Oaks, CA: SAGE Publications, Inc.
- Okorie G. (2015). "Urbanization Problems in Developing Countries." 30 July 2015. Linked in. 28 December 2017.
- Ombudsperson. (2016). By Law Enforcement: Best Practices Guide for Local Governments. Special Report No. 36. 68 pages.
- Oyebanji, A. O., Liyanage, C. & Akintoye, A. (2017). Critical Success Factors (CSFs) for achieving sustainable social housing (SSH). *International Journal of Sustainable Built Environment* 6 (2017) 216–227.
- RBC. (2012). Tree Enforcement Policy. Rushmoor Borough Council. 13th March 2012. 7 pages.
- Reese, J. (2018). "5 Major Problems of Urbanization." Synonym, <http://classroom.synonym.com/5-major-problems-of-urbanization-12084420.html>. 03 May 2018.
- Roslan, R. (2011). Urban Tree Management: Towards Best Practices and Applications. Case Study: Kuala Lumpur. Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science in Urban Development and Management. Universiti Teknologi MARA. May 2011. 149 pages.
- Rungasamy, S., Antony, J., Ghosh, S. (2002). Critical success factors for SPS implementation in UK small and medium enterprises: some key findings from a survey. *The TQM Magazine*, 14 (4), 217–224.
- Russell, H. A. (2015). Neo Synthesis Approach to Policy Implementation of Social Programs: An Alternative Approach to Policy Implementation. *Journal of Sociology and Social Work* June 2015, Vol. 3, No. 1, pp. 17-26.
- Schmied, A. & Pillmann, W. (2003). Tree protection legislation in European cities. *Urban Forestry & Urban Greening*, 2, 115-124.

- Syed Abdul Kader, S. Z. (2006). Tree Preservation Orders Under Malaysian Planning Law: Teeth Without The Bite. *Planners Bulletin*. Malaysian Institute of Planners. February 2006. pp. 10 & 18.
- Tang, J. J., Leka, S., Hunt, N. & MacLennan, S. (2011). Occupational psychosocial health policies in Hong Kong schools: A review and exploration of key stakeholder perceptions. *Health Policy*, 103, 266-275.
- Tsendjav, E. (2011). Factors Affecting the Implementation Effectiveness of Civil Service Reform Policy in Mongolia. PhD thesis. National Institute of Development Administration (NIDA). Bangkok. 195 pages.
- Ugwuanyi, B. I. & Chukwuemeka, E. E. O. (2013). The Obstacles to Effective Policy Implementation by the Public Bureaucracy in Developing Nations: The Case of Nigeria. *Kuwait Chapter of Arabian Journal of Business and Management Review*. Vol. 2, No. 7; March. 2013. 10 pages.
- UN. (2016). Urbanization and Development: Emerging Futures. World Cities Report 2016. United Nations Human Settlements Programme (UN-Habitat).
- UN. (2017). New Urban Agenda. Adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016. A United Nations publication issued by the Habitat III Secretariat.
- UN. (2018). Kuala Lumpur Declaration on Cities 2030. United Nations Human Settlements Programme (UN-Habitat). 13 February 2018.
- Yu, T., Shi, Q., Zuo, J. & Chen, R. (2018). Critical factors for implementing sustainable construction practice in HOPSCA projects: A case study in China. *Sustainable Cities and Society* 37 (2018) 93–103.
- Wan Ali, W. N. A., Hassan N., Hassan, K. & Mat Nayan, N. (2016). The Morphology of Heritage Trees in Colonial Town: Taiping Lake Garden, Perak, Malaysia. *Procedia - Social and Behavioral Sciences*, 222, 621– 630.
- WHO. (2003). Mental health legislation and human rights. Geneva, World Health Organization, (Mental Health Policy and Service Guidance Package).
- Zawawi, E.M.A, Kamaruzzaman, S. N., Ithnin, Z., Zulkarnain, S. H. A. (2011). Conceptual framework for describing CSF of building maintenance management, *The 2nd International Building Control Conference, Procedia Engineering* 20 (1): 110–117.