

Application of problem tree analysis (PTA) and logic model in conceptualising post conservation evaluation (PCE) for heritage building maintenance in Malaysia

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received July 13, 2021 Received in revised form Nov. 29, 2022 Accepted December 08, 2022 Available online December 31, 2022</p> <p><i>Keywords:</i> Evaluation Heritage conservation Logic model Maintenance Post conservation evaluation (PCE) Problem tree analysis (PTA)</p> <p>*Corresponding author: Muhammad Firzan bin Abdul Aziz Interior Architecture Programme, School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia Email: firzan@usm.my</p>	<p><i>A theoretical gap in the area of conservation management in terms of leveraging evaluation practice to built heritage conservation has been identified. Sensitising this shortage, review made in this conceptual paper is basically to introduce Post Conservation Evaluation (PCE) devoted to evaluate maintenance at public heritage museums in the UNESCO Historic Cities of the Straits of Malacca aiming in developing and integrating the agenda of evaluation in the existing local conservation framework. Accordingly, elaboration of maintenance as the PCE subject of concern and the pertaining theories within evaluation field will be provided herein. In particular, this paper will present on document analysis made on the Draft of Special Area Plan (SAP) of Melaka and George Town, through the employment of Problem Tree Analysis (PTA) in the quest to identify on the causal, core, and consequent problems affecting built heritage conservation within the research locale. Finally, the use of Logic Model as a conceptual framework will be demonstrated to derive on strategies required prior developing PCE measures.</i></p>

Introduction

The gap pertaining evaluation in the general conservation domain has been discussed in various literature (Kleiman et al. 2000; Margoluis et al. 2009b; 2009a; Howe and Milner-Gulland 2012; Zancheti and Similä 2012; Eldiasty, Sabry Hegazi, and El-Khouly 2021; Gu et al. 2022). Acknowledging that gap of evaluation is relatively way more apparent in the field of built heritage conservation, the current study aims to enrich the existing body of knowledge of built heritage conservation by introducing an evaluation concept termed as Post Conservation Evaluation (PCE). The genesis of having PCE has been hugely influenced by the necessity in developing new approaches and methodologies in

order to enable assessment of conservation performance (Alonso and Meurs 2012) and the incipient state of Malaysian conservation framework during post conservation phase (Abdul Aziz, Keumala, and Zawawi 2014). Since heritage buildings are considerably priceless and unique assets of built heritage that belong to all humanity (Megahed 2014), the general aim of PCE is to facilitate on evaluation of heritage buildings which have undergone conservation, prior reporting on the limited availability of evaluation on individual units of heritage building (Abdul Aziz, Keumala, and Zawawi 2014).

Besides, development of PCE will be manoeuvred to focus on intervention of conservation instead of assessing building sustainability or environmental performance

which already are in vast availability today such as the Sustainable Building Rating System (SRBS), Facility Performance Evaluation (FPE) and Post Occupancy Evaluation (POE) as can be observed in Darus et al. (2009); Leaman, Stevenson, and Bordass (2010); MD Darus and Atikah (2012); Bee Woon et al. (2015). Despite the differences on the foci of PCE and POE, the value of PCE yet can still be associated with the value of POE which lies in acquiring lessons from existing cases which can later be leveraged to probe improvements in other upcoming projects (Nielson and Taylor 2002).

Familiarising the ‘evaluation language’: Maintenance as ‘project’ within Malaysian built heritage conservation ‘programme’

Apparently, there are many superficial understandings on the evaluation term as different professions develop a different meaning of

evaluation within their respective disciplines according to by the director of Program for Public Sector Evaluation International, Australia (Jerome Winston, personal communication, 08th May 2015). In this regard, the current study hence uses the context of ‘professional evaluation’ as coined by Scriven (1991), which commonly uses ‘evaluands’ that refer to the subjects of evaluation (Davidson 2005). One of the common types of evaluands that explains interventions for change is known as ‘programme and project’ (Austrian Development Agency 2009; International Federation of Red Cross and Red Crescent Societies (IFRC) 2020) is adopted in the current study. The definitions of ‘programme’ and ‘project’ as provided in the glossary for the uses of Malaysian public sector by CeDRE International (2014) are found helpful as following:

Table 1. Definitions of programme and project

Programme	Project
The planned intervention for change, comprising a set of projects (or inter-related set of activities) which contribute to the programme results that have a common focus in terms of desired outcomes and impact over a period of time. A programme can also be divided into sub-programmes, each having its own set of complementary activities, outputs, outcomes and impact.	A specific intervention activity under a programme that helps contribute towards the outcome of a programme. Basically, the project activity typically represents one set of a series of intervention actions required under a programme to bring out desired outcomes under the programme.

Source: (CeDRE International 2014)

As explained by Winston and Rasappan (2008), a programme means any interventions that occur at national, sector, ministry, department, or section levels. This in turn may respond on the need to understand conservation using the context of programme and project. In some countries, Winston and Rasappan (2008), further denoted that every intervention occurring at all the levels of planning hierarchy is termed as programme. Therefore, the general act of built heritage conservation in Malaysia can be understood as a programme based on the meanings of programme and project. This is due to the fact that any conservation programmes require a set of actions that are plan specifically to achieve the desired or pre-determined change, either to cater for a specific problem, or, to fulfil the needs situation of conservation stakeholders involved. The reference can be made from appendix 2 of the Nara Document on Authenticity 1994 which informed conservation as all efforts designed to understand cultural heritage, know its history and meaning, ensure its material

safeguard, and as required, its presentation, restoration, and enhancement (ICOMOS 1994).

Sensitising this matter, the current authors are compelled to provide a debutant study that relates built heritage conservation by the Malaysian public sector with the context of programme and project in the attempt to promote a better way of understanding conservation as a ‘planned intervention for change’ (Pickard 1996). Explicitly, conservation of national heritage is one of the programmes within the Malaysian government agenda (MOF 2014). Conservation of built heritage in Malaysia is in fact profoundly vital to the country. Its agenda is in line with the National Physical Plan and the nation aspiration of Vision 2020 in achieving a fully developed nation status economically, politically, socially, spiritually, psychologically and culturally by the year 2020 (Shamsuddin 2009; Federal Department of Town and Country Planning 2010). Conservation programme of Malaysia can be explicitly categorised under the tourism sector upon the basis that local heritage conservation governance is the main responsibility of the

Department of National Heritage (JWN) at the departmental level, acting under the Ministry of Tourism and Culture (MOTAC) at the ministerial level. This can be further understood by referring to the level of the national development planning

hierarchy (NDPH) where hierarchy of national programmes are typically cascaded from higher level of priority areas to the lower level of sub-sectors (Winston and Rasappan 2008).

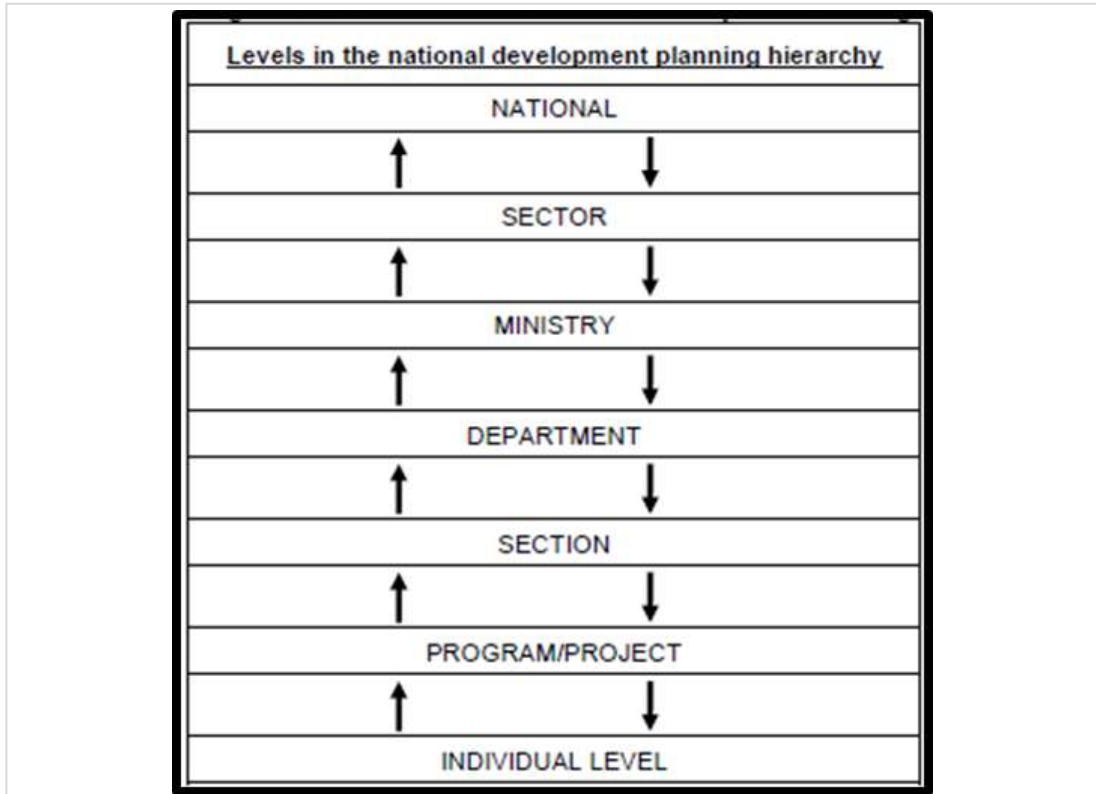


Figure 1. National development planning hierarchy (NDPH) framework (Winston and Rasappan 2008)

Official information describing Malaysian heritage conservation as a national programme is made evidence in the 2016 Estimated Federal Expenditure which basically presents budget information of Malaysian federal government (MOF 2014). Under the MOTAC section in the aforementioned document, conservation programme in specific, Programme 8: National Heritage is presented. With particular reference to it, the objective of Malaysian conservation programme is informed as: (a) To safeguard, conserve, preserve and maintain various types of heritage including tangible heritage, intangible heritage, natural heritage and underwater heritage; and (b) To document heritage fact and promoting heritage awareness, as stipulated in the National Heritage Act 2005 (Act 645).

Following so, four outputs are indicated along with the programme objective as follows:

i. Number of heritage registration

- ii. Number of heritage awareness programmes
- iii. Number of trainers in the field of cultural art heritage
- iv. Number of land and underwater archaeological research

Concluding from this, although maintenance has not been explicitly remarked as one of the programme outputs, maintenance activities are theoretically and practically very influential for the first output as registration of heritage is strongly dependent on the properties state of condition. This explains on why many assertions are made claiming that maintenance and conservation have a strong interrelationships and are inseparable with each other (Feilden 2000; Burden 2004; Babor and Plian 2008; Kamal, Ab Wahab, and Ahmad 2008; Sodangi, Khamidi, and Idrus 2013). With that basis, the foci of current PCE context hence is made specific on maintenance instead of other interventions within

conservation programme. Maintenance and conservation as a matter of fact, have a common focus in terms of desired outcomes and impact. The central role of maintenance in contributing to

the overall results of conservation programme has called upon the essentiality to improve and enhance maintenance culture in Malaysia through monitoring and evaluation agenda.

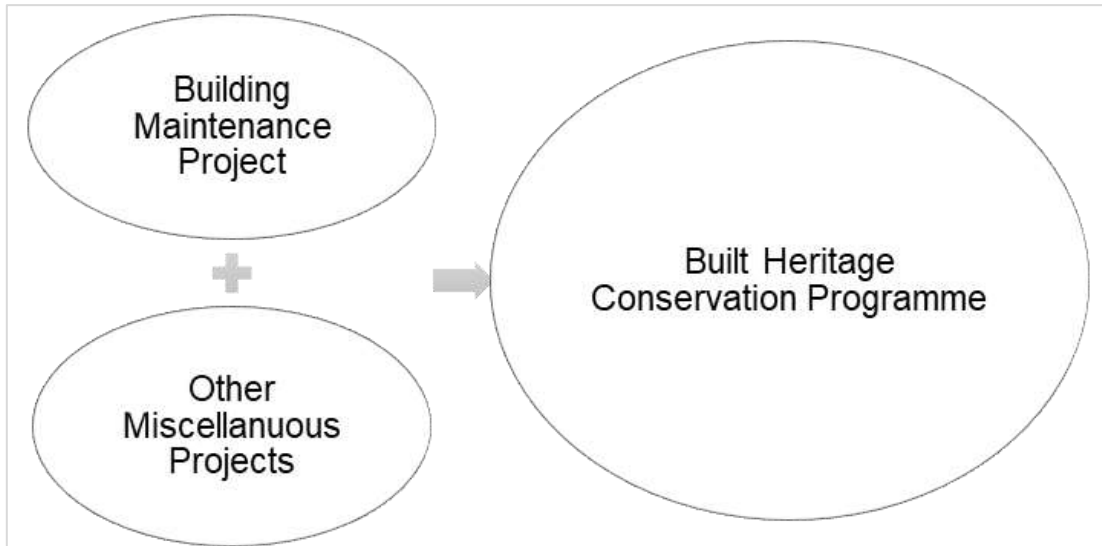


Figure 2. Conceptual framework on maintenance as a project within a built heritage

The paramount importance of maintenance in built heritage conservation

In tune with the old adage of “prevention is better than cure” (Kerr Semple 1985; Syed Mustapa et al. 2007; Rashid and Ahmad 2011; Abdul Rashid and Ahmad 2008), maintenance basically combines technical and administrative actions (Coll and McCarthy Architects 1998) involving protective routine works to prolong a building’s life, function and cultural values (ICOMO 1992; English Heritage 2008; ICOMOS 2010). Following the quest to develop a focused and specific scheme of PCE, the current study has employed a parameter to limits its subject of concern solely to building maintenance, which has become a prime activity in construction industry (Sani et al. 2012). This parameter setting is also due to the identification of maintenance as the activity that carries paramount importance in conservation from both philosophical and practical point of views (Morris 1877; Dann and Cantell 2008; Mohd-Isa, Zainal-Abidin, and Hashim 2011).

Reportedly, both modern and old buildings will definitely get ruined with the absence of maintenance (Taylor 1998; Idrus, Khamidi, and Sodangi 2010). In fact, all buildings regardless of their types, ownerships, locations, sizes, materials, and years built require maintenance to

survive (Government of Ireland 2007; Abdullah and Ken 2008; Lateef 2009). In such manner, it is necessary to understand that heritage building will definitely ruined without any essential maintenance works since it needs to sustain the values of aesthetical, materials, architectural, and historical within it (Taylor 1998; Hashim and Mydin 2012). It is deemed necessary to pay attention to maintenance execution prior reverence of maintenance as the main factor in ensuring the longevity and sustainability of built heritage properties due to its compliance with most of the conservation good practices as specified in various international conservation doctrines (ICOMOS 1964; ICOMOS 1981; ICOMOS 1999; Mohd-Isa, Zainal-Abidin, and Hashim 2011).

Understanding on the problems of built heritage conservation in the UNESCO world heritage sites of Melaka and George Town through problem tree analysis (PTA)

The significant of places compiled in the UNESCO World Heritage List is based upon becoming major attractions and icons of national identity as well as holding international accountability in tourism industry (Shackley 2006; Frey and Steiner 2011; Maghsoodi Tilaki et al. 2014). Inscription of Melaka and George Town

as the World Heritage Sites (WHS) of UNESCO means these two sites have been positioned at the pinnacle of international heritage status (Pendlebury, Short, and While 2009) which therefore signifies the need in perpetuating the received honour (Omar et al. 2013). Prior to reverence as the UNESCO Historic Cities of the Straits of Malacca, both cities of Melaka and George Town were required to have a management plan by UNESCO, which is a prerequisite for inclusion of areas in the World Heritage List since the year 2000 (Vural Arslan 2015).

Table 2. The 11 management strategies for Melaka and George Town

Management strategies for the UNESCO historic cities of the straits of Malacca	i.	Management of the WHS
	ii.	Use of land and buildings
	iii.	Conservation of the cultural landscapes
	iv.	Built heritage conservation
	v.	Compatible development

	vi.	Understanding WHS, education and information
	Vii.	View and vistas
	Viii.	Public realm
	ix.	Access and circulation
	x.	Risk management
	xi.	Urban infrastructure

Source: (AJM Planning and Urban Design Group 2011)

Responding to that demand, the State Government under the provision of Section 16B, Town and Country Planning Act 1976 (Act 172) has prepared the Draft of Special Area Plan (SAP) for both cities. SAP basically contains on detailed planning on the WHS conservation including its guidance on management and implementation (AJM Planning and Urban Design Group 2011). As the conservation management plan for the WHS, aforementioned SAP basically encompasses 11 management strategies as shown in table 2.

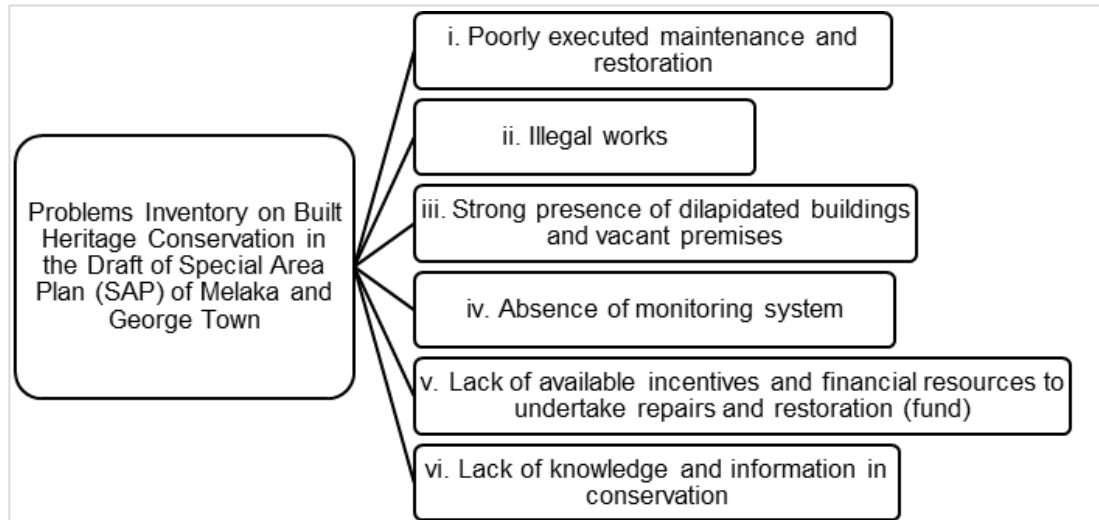


Figure 3. Six Problems relating to Built Heritage Conservation in Melaka and George Town (AJM Planning and Urban Design Group 2011)

A problem inventory which specifically focuses on the management strategy on built heritage conservation section of the SAP is then analysed through PTA with reference to Groenendijk (2003) and Zimmermann, Joubert, and Smit (2008). This subsequently has led to the

determination of poorly executed maintenance and restoration as the core problem of built heritage conservation affecting the UNESCO World Heritage Sites of Melaka and George Town as shown in figure 4:

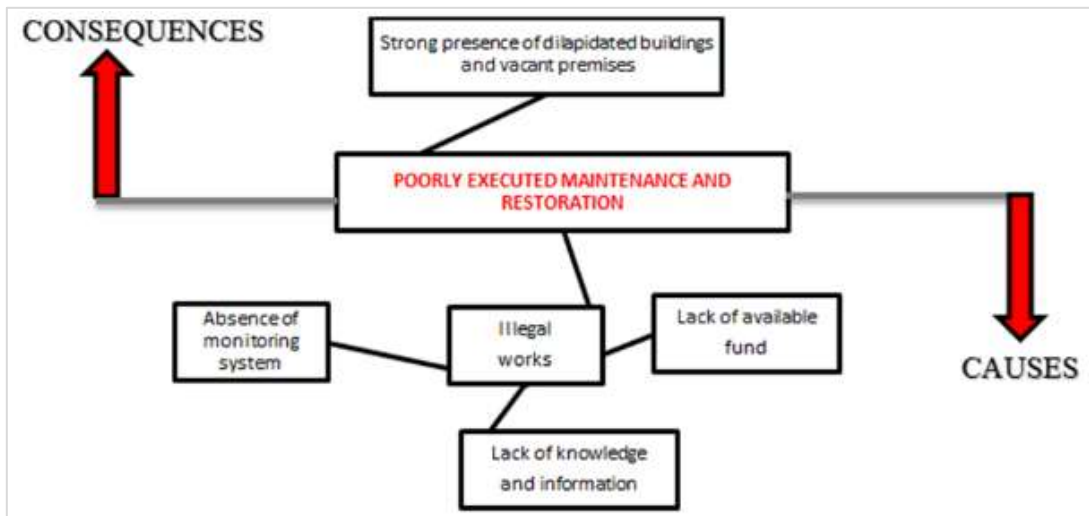


Figure 4. Problem Tree Analysis (PTA) on Built Heritage Conservation Management Strategies for the UNESCO Historic Cities of the Straits of Malacca

Due to the PTA result, the aspects of heritage building maintenance will be further scrutinised as the scope of evaluation in the context of current PCE instead of other interventions such as restoration, rehabilitation, reconstruction, and relocation being associated with conservation (Feilden 2000). Henceforth, by excluding the aspect of restoration from the identified core problem, the remainder of the paper will address poorly executed maintenance as the contextualised core problem of built heritage conservation in the UNESCO WHS of Melaka and George Town. Considering that there is no maintenance free building in the realm of built environment, development of PCE catering for maintenance is expected to be feasible and its demand would be promising.

Application of logic model to understand maintenance as a project of built heritage conservation programme in the UNESCO world heritage sites of Melaka and George Town

Further exploration on the causes and consequences of the core problem is reasonably vital to develop the measures of PCE hence facilitating evaluation. This can be achieved through the identification on required strategies to address on the causes and consequences of the core problem. Intervention strategy is typically associated with interventions to solve a problem situation or fulfilling a need situation of programme stakeholders or clients, which is reflected by the PTA result in the context of this study. Strategies usually involve several activities

and process linked with in one or more ways towards ensuring the achievements of pre-determined targets or results and can be understood as a plan, system, or course of actions or initiatives towards achieving pre-determined outcomes and impact (CeDRE International 2014). Recognising that, logic model can therefore be leveraged to develop the measures of PCE.

Logic model is renowned as a state-of-the-art tool for programme planning, monitoring, evaluation, and improvement (W.K. Kellogg Foundation 2004; Kaplan and Garrett 2005). Theoretically, this model provides logical explanation on how an intervention is understood to work (Funnell and Rogers 2011) and often being referred to other terms such as 'programme theory' and 'theories of change'. Based on past literature search, it is found that the application of logic model to facilitate on the purposes of planning, monitoring, and evaluation in the field of built heritage conservation within the Malaysian context is critically sparse. This can reasonably be due to the complex relationship between conservation programme's resources, activities, and intended results. Thus, Kaplan and Garrett (2005) opined that developing a logic model is not a quick and easy process. Furthermore, Margoluis et al. (2009a) informed that: "Conceptual linkages among interventions, outcomes, and impacts are relatively unknown. Because conservation is a relatively new field, many of the conceptual underpinnings that delineate associations and potential causality

among interventions, outcomes, and impacts are untested and unknown. Designing conservation evaluations at the outset, therefore, is especially challenging because data requirements are unclear and expected results are unpredictable”.

The non-existence of logic model application within Malaysian conservation realm can also be linked with the notion that local conservation industry is still in progressing mode (Syed Mustapa et al. 2007; Mohamad, Akasah, and Rahman 2013). Hence, this can rationalise on presumption that commissioning of professional evaluation service is yet to take place. In the advent of that, United Nations Development Programme (2009, 201) stated that evaluation entities across national, regional, and global levels are increasingly making significant contributions in the field of evaluation. Correspondingly, prominent evaluation bodies in Malaysia such as the Centre for Development and Research in Evaluation, International (CeDRE) and Malaysian Evaluation Society (MES) are noticeably active in initiating evaluation agenda as well as advocating evaluation capacity throughout the country (Cedre International

Official 2015; Malaysian Evaluation Society 2015). More to that, the emergence of monitoring and evaluation as critical tools that contributes to an improved organisational effectiveness and governance (Tam 2013) has been evident prior to implementation of Outcome-Based Budgeting (OBB) in the year 2013 as stipulated in the 10th Malaysian Plan (10MP).

Judging from this circumstance, emergence of evaluation practice for the especially by the public sector will be inherent in the years to come. This scenario would justify on the necessity to develop proper measures of evaluation in the quest to evaluate built heritage conservation via PCE. In this sense, logic model which represents the logical linkages of a programme or project is deemed imperative. Apparently, there are many applications of logic model to facilitate monitoring and evaluation in various other fields, such as in areas of rural social work (Openshaw, Lewellen, and Harr 2011), community-based initiatives (Kaplan and Garrett 2005), and delivery programme for school curriculum (Cooksy, Gill, and Kelly 2001).

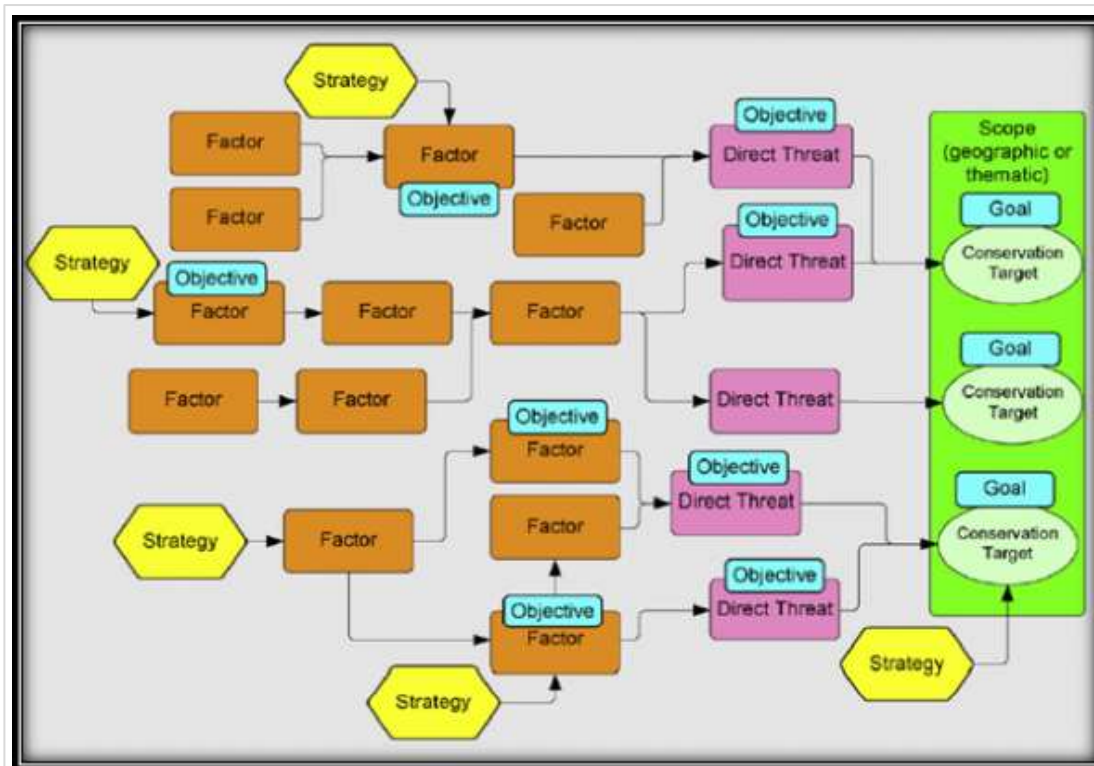


Figure 5. Conceptual model for conservation evaluation (Margoluis et al. 2009b)

Within the general field of conservation, an exemplar on the use of logic model to represent conservation programme can be referred to Margoluis et al. (2009b)'s generic conceptual model which is proposed to evaluate on programme for marine conservation as shown in figure 5. However, with consideration to the pervasive nature of logic model formats, W.K. Kellogg Foundation (2004) posited that there is no best format as it mainly depends and varies on

how programme managers select the best helpful representation that fits their particular programme. This explains on why the director of Program for Public Sector Evaluation International, Australia, argued that Margoluis et al. (2009b)'s conceptual model is more to PTA and causal tree analysis instead of a logic model (Jerome Winston, personal communication, 06th April 2015) (Winston and Rasappan 2008).

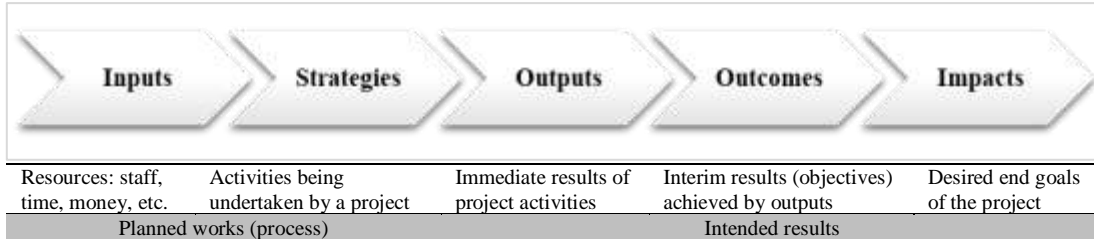


Figure 6. Basic components of logic model (W.K. Kellogg Foundation 2004; Margoluis et al. 2009b)

Within logic model, the connection between planned works and intended results of conservation programme can be illustrated in a systematic diagram W.K. Kellogg Foundation (2004), comprising five typical components as shown in Figure 6. In order to understand the five components better, reference to CeDRE International (2014)'s glossary would be helpful as followings:

- i. INPUT: The resources, both human and other used to produce OUTPUT.
- ii. PROCESS: The operations involved to transform INPUT to OUTPUT, typically include a series of activities and actions aimed at producing a set of specific OUTPUT.
- iii. OUTPUT: Results associated with programme and activities for which management assumes direct and immediate responsibility.
- iv. OUTCOME: Result that occurs as a consequence of a programme's outputs, maybe short-term or long-term depending on the types of outputs being produced and the nature of problem or need being addressed. Outcome can occur for individuals, community, organisations, and government.
- v. IMPACT: The follow through consequences or effects of one or more outcomes from one or more outputs and activities under them which generally take longer time to occur though not necessarily always long term.

Imperatively, Kaplan and Garrett (2005) posited that assumptions play an integral role in

developing a logic model in order to articulate and anticipate the success of a programme, especially on the intended results of a programme or project as represented by the output, outcome and impact components. With consideration to the five basic components of a typical logic model, the logical linkages and chained relationships of the causes and consequences of the core problem namely, poorly executed maintenance, are made based on deliberate assumptions. Relevant seminal and existing research in pertinent to both topics of general maintenance and specific conservation-based maintenance hence are of absolute importance in solidifying on the made assumptions.

Conclusion

Conclusively, evaluation through PCE may assists in achieving an ideal state of conservation and best value of a heritage building, as it is contributory to maintenance project that is positively planned, strategically organised, proactively lead, holistically controlled, and dynamically implemented as promoted by Olanrewaju and Abdul-Aziz (2015).

With the application of PTA and logic model, the conceptual framework representing maintenance as project to deter the core problem of poorly executed maintenance is developed as attached in appendix A. Based on the conceptual framework, there are five pertaining strategies

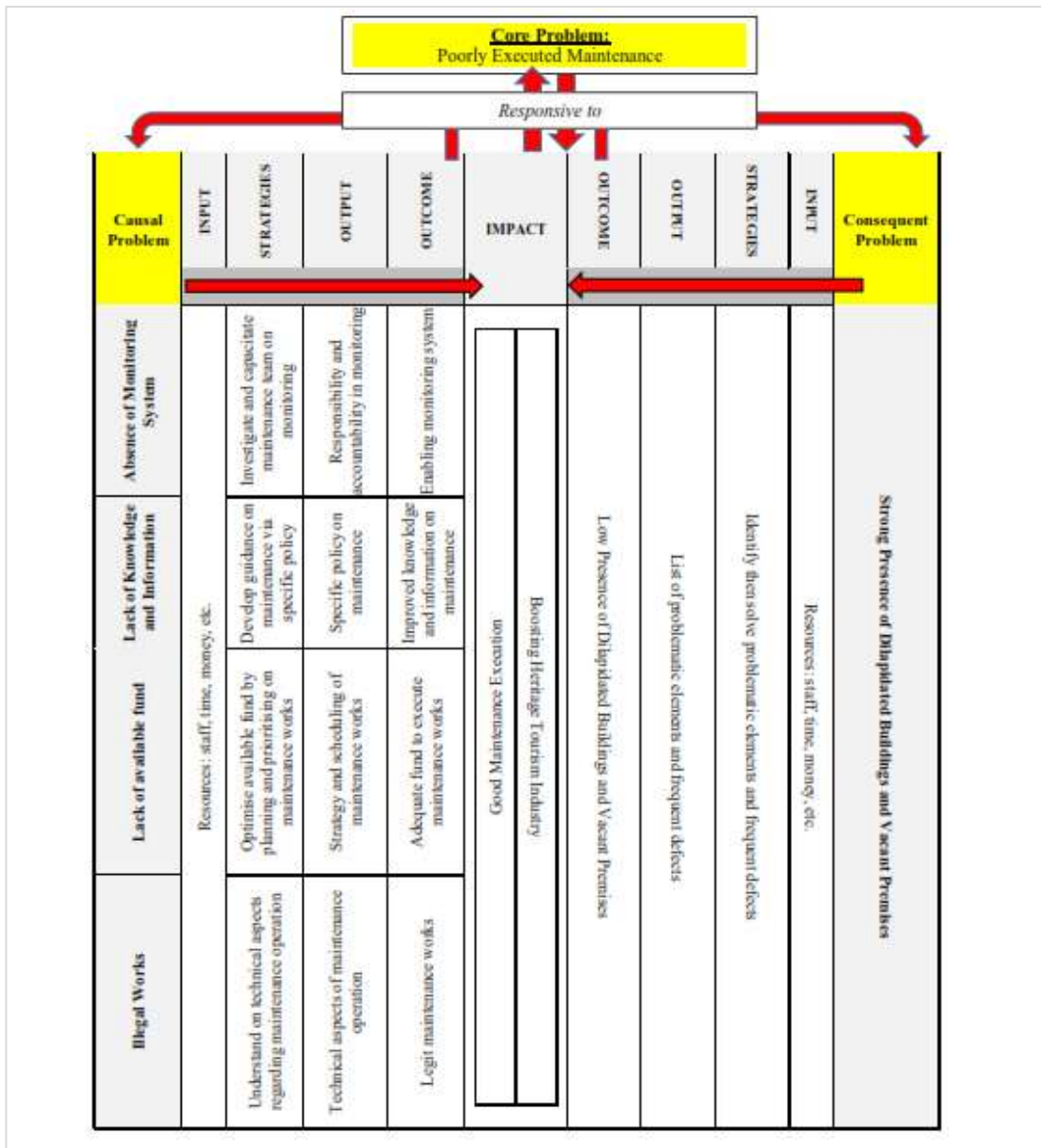
being derived which will be succeeded by the development of measures for PCE comprising Key Result Areas (KRAs), Key Assessment Questions (KAQs), and Key Evaluation Questions (KEQs) in the next upcoming publication. In accordance to the logic model, the five strategies to cater the core problem of poorly executed maintenance in the UNESCO WHS of Melaka and George Town are identified as such:

- i. Investigate and capacitate maintenance team on monitoring;
- ii. Develop guidance on maintenance via specific policy;
- iii. Optimise available fund by planning and prioritising on maintenance works;

- iv. Understand on technical aspects regarding maintenance operation;
- v. Identify then solve problematic elements and frequent defects.

Appendix A

Conceptual framework on understanding maintenance as a project of built heritage conservation programme in Melaka and George Town using Logic Model.



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Author(s) contribution

Muhammad Firzan bin Abdul Aziz contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

Wong Lai Kee contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

