ACHIEVING SUSTAINABLE CAMPUS THROUGH INTEGRATED PROJECT DELIVERY IN NORTHERN REGION HIGHER EDUCATION INSTITUTION

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ABSTRACT

The sustainability commitment of a nation can be reflected in how much attention is given to the sustainability development of youth and future leaders. Higher Education Institutions (HEIs) are one of the main players in producing the nation's future leaders by emulating the sustainability agenda into the curriculum and physical infrastructures. Therefore, it is crucial that sustainable campuses are designed to fulfil the educational needs of these future leaders. However, due to the nature of construction development, campuses are being developed in the traditional methods which are burdened by many challenges such as project delay, fragmented processes and high construction waste. To overcome these challenges, many scholars have proposed the Integrated Project Delivery (IPD) as a method that is beneficial for sustainable development. Accordingly, this research investigated a novel approach to sustainable campus development by identifying how IPD can be applied in the physical development of campuses specifically within the Malaysian northern region HEIs. Semi-structured interviews were conducted with 6 participants who were the experts or main decision- makers in the respective HEIs. The qualitative data was analysed using the Template Analysis method with the aid of Nvivo10 software. The findings indicate that although the participants were aware of the importance of sustainability development, most of them were unfamiliar with most of the IPD practices in campus development. Nevertheless, some of the IPD practices were applied by the participants. The guideline developed at the end of this research highlights the current practices which overlap the IPD principles and suggests the additional aspects of IPD that can be merged with sustainable campus development activities. Some limitations of the study are also indicated, suggesting opportunities for future research.

Keywords: Sustainable construction, sustainable campus development, Integrated Project Delivery, Higher Education Institution.

ABSTRAK

Sesebuah negara yang beriltizam ke arah kemampanan dapat dilihat melalui kepekaan pembangunan mampan golongan belia dan bakal pemimpin negara tersebut. Institusi Pengajian Tinggi (IPT) adalah salah satu daripada peneraju utama yang berperanan untuk melahirkan generasi kepimpinan negara. Justeru, ia seharusnya mencerap agenda mampan melalui kurikulum dan prasarana fizikal. Oleh itu, adalah penting kampus mampan direka bentuk bagi memenuhi keperluan pengajian bakal pemimpin pada masa hadapan. Walau bagaimanapun, disebabkan perkembangan pembangunan yang sebegitu rupa, kampus-kampus dibangunkan berdasarkan konsep binaan secara konvensional, iaitu dibelenggu dengan pelbagai masalah seperti kelewatan projek, pembangunan yang tidak sekata dan juga pembaziran bahan binaan. Bagi mengatasi cabaran-cabaran ini, ramai cendikiawan mencadangkan kaedah *Integrated Project Delivery* (IPD) sebagai kaedah pembinaan yang berkesan ke arah pembangunan mampan. Maka, melalui kajian ini, pembangunan kampus mampan akan dikaji dengan mengenal pasti kaedah penerapan dalam pembangunan fizikal kampus, terutamanya dalam lingkungan IPT di utara Semenanjung Malaysia. Kaedah temu bual separa berstruktur telah dijalankan dalam kalangan 6 orang responden yang merupakan pakar atau pembuat dasar di IPT terbabit. Data kualitatif dianalisa dengan menggunakan *Template Analysis* dengan bantuan perisian *Nvivo 10*. Dapatan kajian menunjukkan bahawa walaupun responden yang ditemubual menyedari akan kepentingan pembangunan mampan, namun kebanyakan mereka tidak menyedari akan kebanyakan amalan IPD dalam pembangunan kampus. Walau bagaimanapun, terdapat beberapa amalan IPD yang diterapkan oleh peserta kajian dalam kampus masing-masing. Panduan yang dibangunkan pada akhir kajian ini adalah dengan mengetengahkan amalan-amalan terkini yang bertindih dengan prinsip-prinsip IPD dan mencadangkan aktiviti-aktiviti tambahan yang boleh digabungkan dengan pembangunan kampus yang mampan. Beberapa kekangan dalam kajian ini dinyatakan dan mencadangkan peluang bagi penyelidikan pada masa hadapan.

Kata kunci: Pembinaan mampan, pembangunan kampus mampan, *Integrated Project Delivery*, Institusi Pengajian Tinggi.

To my heart and soul,

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LIST OF ABBREVIATIONS

A/E	Architect/ Engineer
ADR	Alternative Dispute Resolution
AIA	American Institute of Architect
AIACC	American Institute of Architect California Council
AV	Audio Visual
BAS	Building Auto Systems
BIM	Building Information Modelling
BOT	Build Operate and Transfer
BOOT	Build Own Operate and Transfer
CE	Concurrent Engineering
CM	Construction Manager
CMR	Construction Management at Risk
CTK	*Cadangan Teknik dan Kewangan* (Finance and Technical Proposal)
DB	Design and Build
DBB	Design Bid and Build
DBFO	Design Build Finance Operate
DBOM	Design Build Operate Maintain
DESD	Decade of Education for Sustainable Development
EPU	Economic Planning Unit
GBI	Green Building Index
GC	General Contractor
GMP	Guaranteed Maximum Price

HEI	Higher Education Institution
IBS	Integrated Building System
ICT	Information and Communication Technologies
ICUN	International Conference of United Nation
IPD	Integrated Project Delivery
KJR	*Jabatan Kerja Raya* (Department of Maintenance)
JPP	*Jabatan Pengurusan dan Pembangunan* (Department of Management and Development)
KPM	*Kementerian Pelajaran Malaysia* (Malaysian Education Ministry)
Kwh	Kilo watt per-hour
LCC	Life Cycle Cost
LED	Light Electronic Diod
LEED	Leadership in Energy Environmental Design
LESTARI	Institute of Environment and Development
MP	Multi-Prime
NHS	National Health Services
PM	Project Manager
RM	Ringgit Malaysia
SCM	Supply Chain Management
SPN	*Seksyen Pengurusan Nilai* (Value Management Section)
UK	United Kingdom
UKCG	United Kingdom Construction Group
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya

UMT	Universiti Malaysia Terengganu
UN	United Nations
UNCED	United Nation Conference Environment and Development
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UniMAP	Universiti Malaysia Perlis
UPM	Universiti Pertanian Malaysia
US	United State
USA	United State of America
USGBC	United State Green Building Council
USM	Universiti Sains Malaysia
UUM	Universiti Utara Malaysia
VM	Value Management

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The first chapter enlightens nine parts which are: (i) background of the study, (ii) problem statement, (iii) research questions, (iv) research objective, (v) scope of the research (vi) research process, (vii) significance of the study, (viii) structure of research (ix) summary.

1.2 Background of the Research

The significance of sustainable campus development is really crucial in developing the younger generation as the university is a place to create new future leaders of the world (Alshuwaikhat & Abubakar, 2008). Students from all over continent gathered in university to absorb knowledge's formally and in-formally trough the classes and the environment (Cortese, 2003; Razak, 2008). Based on this pedagogy, the ideology to prepare the future leaders must be start at the foundation of the institutions (Cortese, 2003; Robert & Westville, 2008).

According to Finlay (2010), in order to encourage the sustainable campus development the participation from the entire user from inside the campus area and the surrounding area is required to ensure the energy and water consumptions can be reduced. Concurrently, efforts can be made to minimise the carbon footprint to achieve the sustainability within the area. Furthermore, Mat et al. (2009), mentioned that to succeed in developing the sustainable campus there are several physical factors

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