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SMART HOME ESTABLISHMENT FOR SUSTAINABLE PROPERTY
DEVELOPMENT: A CASE STUDY AT IOI PROPERTIES GROUP BERHAD

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The thesis is submitted in partial fulfilment of the requirements for the award of
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DECLARATION

“I admit that this thesis is the result of my own, except certain explanations and passages where every of it is cited with sources clearly.”

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DEDICATION

I would like to dedicate the appreciation to my family members especially my lovely parents and family Mr. Lee Tek Foo, Mdm. Liow Kim Lan, Mr. Lee Chun Kit, Miss Lee Wan Ting, and my lover Mr. Lee Kin Wai who are supported and encouraged me from spiritually and financially. Secondly, I would like to say billion thanks to my beloved supervisor and panel who guided me throughout the research. Lastly, thanks to my housemates and course mates who assisted me through the journey of research.

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ABSTRACT

This bachelor degree dissertation topic is discusses about the smart home establishment for sustainable property development: a case study at IOI Properties Group Berhad (IOIPG). The objective of the study is to investigate the criteria of smart home system and determine the process of project management in property development industry. Thus, the research focuses on two main objectives as; (1) To identify the criteria of smart home for sustainable property development, and (2) To investigate the process involved in smart home establishment. Furthermore, the researcher will conduct the case study in qualitative research method, which comprised the semi-structured interview to investigate the importance for adopting of smart home criteria and implementing the process of project management in IOI property developer. Nevertheless, the researcher will propose the innovation suggestions in order to enhance the effectiveness and efficiency of installing suitable criteria of smart home in IOI property development project. In a nutshell, the criteria system relates to advance of information technology will become the latest topic for the Malaysia property developers in order to move forward their industrial from local market to globe marketplace.

Keywords : *Sustainable Property Development, Smart Home Establishment, Technology Adoption, Project Management*

ABSTRAK

Bagi memenuhi disertasi ijazah sarjana muda topik ini membincangkan mengenai penubuhan rumah pintar untuk mengembangkan hartanah yang mampan: satu kes kajian diadakan di IOI Properties Group Berhad (IOIPG). Objektif kajian ini adalah untuk mengetahui kriteria dalam sistem rumah pintar dan untuk menentukan proses pengurusan projek dalam industri pembangunan hartanah. Oleh itu, kajian ini memfokuskan kepada dua objektif iaitu; (1) Mengenal pasti kriteria rumah pintar untuk mendapatkan pembangunan hartanah yang mampan, dan (2) Mengetahui proses yang terlibat dalam menubuhkan rumah pintar. Disamping itu, penyelidik turut menjalankan kajian kes ini melalui kaedah penyelidikan kualitatif, dan menjalankan temu bual secara separa berstruktur. Kajian ini adalah untuk mengetahui kepentingan dan penggunaan kriteria di dalam rumah pintar dengan pelaksanaan proses pengurusan projek secara setara dalam pembangunan hartanah IOI Syarikat. Walau bagaimanapun, penyelidik juga memberikan inovasi cadangan inovasi untuk meningkatkan keberkesanan dan kecekapan supaya dapat mengaplikasikan kriteria yang sesuai di dalam rumah pintar untuk projek pembangunan hartanah IOI Syarikat. Konklusinya, sistem kriteria ini berkait dengan teknologi maklumat yang akan menjadi topik terkini bagi pemaju hartanah Malaysia untuk bergerak dalam industri pemaju hartanah dari pasaran domestik sehingga ke pasaran antarabangsa.

Kata Kunci :Kelestarian Pembangunan Hartanah, Pembangunan Hartanah, Penubuhan Rumah Pintar, Penggunaan sistem Teknologi, Pengurusan Projek

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LIST OF ABBREVIATION

ABBREVIATION	MEANING
AmI	Ambient Intelligent Technology
CCTV	Close Circuit Televisions
CDMA	Code Division Multiple Access
CEO	Chief Executive Officer
CIC	Connected Intelligent Community
CR	Corporate Responsibility
DHW	Domestic Hot Water
DLP	Defect of Liabilities Period
EMS	Environmental Management System
ERES	European Real Estate Society
GBI	Green Building Index
ICT	Information and Communication Technology
IOIC	IOI Corporation Berhad
IOIPG	IOI Properties Group Berhad
IT	Information Technology
JPPH	Jabatan Penilaian Perkhidmatan Harta
KETTHA	Ministry of Energy, Green Technology and Water
M&E	Mechanical and Electrical
MPU	Micro Processor Unit
NFPA	National Fire Protection Association
PMBOK	Project Management Book
<i>PMBOK Guide</i>	<i>Project Management Body of Knowledge</i>
PMIS	Project Management Information System

ABBREVIATION**MEANING**

PV	Photovoltaic
RWH	Rain Water Harvesting
SPAN	Suruhanjaya Perkhidmatan Air Negara
TBL	Triple Bottom Line
TEG	The Expat Group
UK (DTI)	UK Department of Trade and Industry
WBDG	Whole Building Design Guide
WCED	World Commission on Environment and Development

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A Smart Home is clarified as providing to the home owners security, comfort, energy efficiency with convenience and low operating costs. The smart home is term commonly used to explicit a residence that has appliances, lighting, heating, air conditioning, TVs, computers, multi-media, security and camera system that are able to connect with one another and can be controlled remotely by a time schedule. Even the home owner is still can control in any location in the world via phone or internet. According to Smart Home Energy (n.d.), one of the published of UK Department of Trade and Industry (DTI) in year 2003 claims that smart home as “*A dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored or accessed.*” Furthermore, definition of smart home contains of highly advanced smart technologies and interconnected many devices in a home to enhance the quality of living lifestyle. An appropriate explanation from the Smart Home Association in The Netherlands by Bierhoff *et al.* in Erfaneh *et al.*(2012), explicit about smart home as the integration of technology through home environments for providing the higher comfort and quality of living at home.

Therefore, the smart home is also interrelate for sustainable property development. The sustainability of word comes from Robertson (2014) defines the

word “sustainability” referring to a systems and processes which are able to persist and operate in property development over long periods of time. Therefore, the meaning of sustainable development clarifies meet the needs of the present and future generation without compromising the ability in future (WCED, 1987). Hence, the researcher needs to define the property developers to implement the technology adoption in order to establish the smart home in sustainable way. Some of property developers are tends to build an environmental-friendly and high energy efficiency of smart home by using corporate’s best model. Yet, few of property developers are purposely to build a smart home system concept is to improve the comfort and quality of living style through advance technology device with spatial and space conditions (Erfaneh *et al.*, 2012).

In addition, the smart home concept is still low adoption and implement in property development industry especially in Malaysia compares to United States American and United Kingdom. According to Tan (2015) as one of the PENTAMASTER Corporate Berhad Group Executive Chairman highlights that plans to provide intelligent home system for the property development leveraging on its smart automation technology. Therefore, researcher needs to determinate the property developers to adopt the technology in smart home establishment for sustainable property development. Besides that, the researcher needs to identify the suitable criteria of smart home for sustainable property development in order to fulfil the upcoming of market demand. Last but not least, the process of designing smart home is involves in smart home establishment and provides the innovation solutions to foster smart home establishment for sustainable property development in Malaysia.

1.2 Problem Statement

In aspect of sustainable property development, Malaysia is still lagging behind from these major markets likes Singapore, Australia, United Kingdom and the USA. According to Muhammad and Yasmin (2015), the sustainable on property market only being introduced in the mainstream market in the last two years. There is the problem of gap between developed countries and third world country such as Malaysia.

Furthermore, the Europe study of smart home is still niche market in Europe even the continuous development over the past 10 and more years in Europe (BSRIA Smart Home, 2012). According to BSRIA Smart Home (2012), it is more than one in eight European households will be 'smart homes' by 2019. In the USA and Europe countries implements smart home automation system in household for sustainable property development in order to increase the high energy efficiency of energy conservation.

Another action taken by Tan (2015) claims that the *StarBizWeek* group is exploring several high-end condominium projects in Malaysia and Asia. It is equips them with the group's new intelligent home system. According to Tan (2015) professes: "*The group is now talking to deal with installation smart home system for a Kuala Lumpur in Malaysia.*" One of the convincing UEM Annual Report (2013) of property development in Kuala Lumpur which is developed Symphony Hills, it is the first luxury residential property and comes the country's first of Connected Intelligent Community (CIC); while it is implementing smart-home features and community connectivity through high-speed broadband. The researcher should identify the criteria of smart home for sustainable property development that existing of adoption technology in developed country in order to toward nation 2020, despite the slow adoption of smart home concept for sustainable property development. Hence, Malaysia is necessary to breakthrough the gaps between our nation and developed countries.

1.3 Research Questions

I-Innovations (2005) emphasises that smart home is a dwelling that adoption technology and automation to provide a safe and hassle-free lifestyle to its residents. There is no high-tech gadgets placed in the home. Smart homes are implementing Information Technology (IT) features inside the home and provides an e-connect by using the web and internet. The researcher needs to define the criteria of smart home for sustainable property development. All these criteria of smart home could expand the smart home market in sustainable property development.

The research question are show below:

- i. What are the criteria of smart home for sustainable property development?
- ii. What are the process involved in smart home establishment?
- iii. What are the innovative solutions to foster smart home establishment for sustainable property development?

1.4 Research Objectives

The objective of the study is to investigate the criteria of smart home system that implement in IOI Properties Group Berhad (IOIPG) in there project. Besides, the study also determined the process of project management in property development industry. In addition, this study is provides the innovation solution to cultivate the smart home establishment for sustainable property development.

The research objective of this project is:

- i. To identify the criteria of smart home for sustainable property development.
- ii. To investigate the process involved in smart home establishment.
- iii. To suggest innovation solutions to foster smart home establishment for sustainable property development.