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## FUTURE HOMES: INTEGRATION ELEMENT OF A HEALTHY HOME AND SMART SYSTEM TO ENHANCE WELLBEING FOR ALL

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**Highlights:** Housing is more than shelter or the physical structure. A more descriptive term is the residential environment, which is defined by the World Health Organization (WHO) who are expert committee on the public health aspects of housing as a 'The physical structure that man uses for shelter and the environs of that structure including all necessary services, facilities equipment and devices needed or desired for the physical and mental health and social well-being of the family and the individual'.

**Key words:** *healthy home, smart system, future homes, elements of healthy home, wellbeing.*

### Introduction

According to the National Center for Healthy Housing (NCHH), a healthy home is housing that is designed, constructed, maintained, and rehabilitated in a manner that is conducive to good occupant health. Our housing and our health are at once inseparable and distinct. Together, they reflect two of our most basic needs for individual and collective identity, privacy, social progress and indeed survival itself. Nevertheless, the fact that improved housing means improved health in a general way has been accepted for well over a century.

A collection of data analysed in this research is gained through literature review from other authors in the aspect of healthy home, technology, smart system, Internet of Things (IoT) and smart home technology in Malaysia. Secondary data, such as books, articles, journals, newspapers, web page, reports, thesis, and conference proceeding were also the sources of information of this paper. The review process involves of data selection, data analysis and reporting. Review process focuses on the data selection. The analysis attempts to review on presenting the existing knowledge related to the use of IoT for smart home in Malaysia context, current issues, problems faced amongst Malaysians on smart home technology integrating with elements of healthy housing. The objective of this research is to propose a basic guideline that applicable for Future Homes: Integration element of a Healthy Home with Smart System to enhance wellbeing for all.

There are a few elements that most related to healthy homes which are structure / interior material & finishes, ventilation, cleanliness, safety and security, facilities, lifestyle and also water system.

This research plays a vital social role, assisting our government and businesses to develop services, policies, and economies as well as community health that are responsive to an identified need. It contributes to Malaysia economic wellbeing, by ensuring that people health to these needs are relevant and properly manage and identified. Consumers of market and social research include State and Federal government agencies, companies and non-government organisations in fact; any organisation that needs to better understand the community about healthy home environments integrating with smart home system towards healthy living, injuries and disease free, or relevance will use this research. Construction industry players play important roles in housing construction in Malaysia. There are architects, NGO, scientist, contractor, supplier, developer, interior designer, landscape designer, quantify surveyor, building surveyor and many more. This research may help them to improve our quality of life through living inside healthy home environment.

The idea of a smart home is getting attention for the last few years. The key challenges in a smart home are intelligent decision making, secure identification, and authentication of the IoT devices, continuous connectivity, data security, and privacy issues. The existing systems are targeting one or two of these issues whereas a smart home automation system that is not only secure but also has intelligent decision making and analytical abilities is the need of time (Ridzwan Majeed et al, 2020). In the actual era of smart homes and smart grids, advanced technological systems that allow the automation of domestic tasks are developing rapidly. There are numerous technologies and applications that can be installed in smart homes today. They enable communication between home appliances and users, and enhance home appliances' automation, monitoring and remote-control capabilities. This research, by introducing the concept of the smart home and the advent of the smart grid, investigates technologies for smart homes.

Moreover, home Automation (HA) provides an intelligent interface that monitors and learns the users' habits and might anticipate and facilitate their movements. HA can make life easier and more comfortable or provide some energy efficiency savings by interacting with users remotely [82]. HA provides part of the system for managing the smart home. However, the HA system would need to be combined with non-automated devices for user interaction. For example, using only HA systems would not provide users with the ability to adjust their energy usage. But provided that, feedback is given to end-users based on the control activities performed as part of the smart home automation system. Such technology could well be included into an intelligent system that saves energy and improves thermal and visual comfort in the home by implementing both short-term and long-term thermal and visual discomfort indices.

As an important component of the Internet of Things (IoT), smart homes serve users effectively by communicating with various digital devices based on IoT. In the ideal version of a wired future, all devices in smart homes communicate with one another seamlessly. Smart home technology based on IoT has changed human life by providing connectivity to everyone regardless of time and place. Home automation systems have become increasingly sophisticated in recent years. These systems provide infrastructure and methods to exchange all types of appliance information and services. A smart home is a domain of IoT, which is the network of physical devices that provide electronic, sensor, software, and network connectivity inside a home. Smart homes are automated buildings with installed detection and control devices, such as air conditioning and heating, ventilation, lighting, hardware, and security systems. These modern systems, which include switches and sensors that communicate with a central axis, are sometimes called "gateways." These "gateways" are control systems with a user interface that interacts with a tablet, mobile phone, or computer; the network connectivity of these systems is managed by IoT. Since 2010, researchers have analyzed IoT-based smart home applications using several approaches. Regardless of their category, existing research articles focus on the challenges that hinder the full utilization of smart home IoT applications and provide recommendations to mitigate these problems. Research on smart home applications is dynamic and diverse (Wood, L. 2019).

As we continue to deal with the current pandemic and all of its ripple effects, it is recommend taking the time to make some observation towards this guideline in order to make our life and well-being healthier as well as maximize the comfort level of your home. Being able to live and work in a comfortable home is a great way to alleviate the stress from everything else going on in the world. Thus, this framework will go through the process in order to commercial it through future research, proper R&D, copyright as well as into intellectual property and compile it accordingly.

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