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The Characteristics of Users in the Adoption of Low Loss Microwave Transmission Glass: A Conceptual Paper.

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Abstract

This paper aims to examine the relationship between users' characteristics towards adopting the LLMTG. These relations were found correlated in its intention to adopt this type of glass in building structures. Despite the indication provided by numerous empirical studies, the organizations that adopt the LLMTG will gain more competitive advantage and improvement. It is strongly believed that this attempt would contribute both to knowledge of the diffusion of innovation and to implications for practice by assisting the industry to understand the important factors when adopting innovation. Rich data will be collected using questionnaire among managers from all industrial in Malaysia.

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Keywords: Commitment to product field; Innovation-related core benefit; Expected financial benefit; User-manufacturer interaction; Low Loss Transmission Glass (LLMTG); Adoption;

1. Introduction

A recent innovation in the glass technologies for building known as Low Loss Microwave Transmission Glass (LLMTG) and users' characteristics has led to a renewed interest in the study of its adoption among users in Malaysia. Malaysia which is a tropical rainforest country, experienced consistently hot and rainfall throughout the year. According to data from Official Website Malaysian Meteorological Department (MetMalaysia 2015), the temperature at night is still minimum, but during the day, the highest temperature recorded almost at 34^{0}C. As a result, the majority

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all of workplaces, business edifices and homes are furnished with air-conditioning in Malaysia for diminishing high temperature (Sadrzadehrafiei et al., 2012; Lundgren & Kjellstrom 2013). With a specific end goal to overcome the risk of great warmth, a few studies explore diverse building outline setups to give an ideal backing to architects in choosing the configuration of the building (Echenagucia, Capozzoli, Cascone & Sassone 2015). The government of Malaysia has taken decisive steps to embrace energy saving designs of its buildings, influencing other sectors to adapt the same concept in the future. The establishment of the Energy Comission on 1 May 2001 under Energy Comission Act 2011 is an example of the effort for enhancement of energy sector in Malaysia. They proposed a diamond shaped building as an artistic base structure which incorporates energy saving building components, and taking into account is more productive utilization of energy source rather than the ordinary buildings. It was officially launched on 31 May 2011 (Energy Commission Diamond Building, 2013). Arasteh, (2002) studied that one of the main factors of residential cooling barrier is solar heat gain through windows. Therefore, this provides the need for necessary solar control to minimize energy use, then the combination of good shade management with windows will be the best strategy with their specific relevance to hot climates (Makaremi, Salleh, Jaafar, & GhaffarianHoseini 2012; Sadrzadehrafiei et al., 2012). This can be observed at the Energy Comission building in Putrajaya which implemented with the shape of diamond to reduce solar impact with the tilted energy saving glass (Mansour, Kandar & Elahe 2013).

Among the innovation technologies that lead to energy efficiency in new construction and, that is one of the most effective in terms of energy savings is the energy saving glass (Aboulnaga 2006, He et al., 2014 & Latha et al., 2015). It was found that the design of a building is very important because it is one of the determinations whether the cooling loads by using cooling systems or power ventilation system. The effectiveness of the innovation glass is important in moderating energy utilization when the ratio of glass is higher in the building envelope. This is admittedly since windows act as a medium of heat exchange with infrared waves (IR) where the glass absorbs and consequently expanded temperature inside of the room (Latha et al., 2015). However, the cost will also be important aspects in the selection of glass with the best thermal reduction thus minimize the cooling barrier (Tibi & Mokhtar 2014). The Malaysian government has prepared a scheme for the implementation of green technology, Green Technology Financing Scheme. Among the criteria that could be related to LLMTG are criteria for building and township sector (GreenTech Malaysia, 2015). Building envelope, lighting acceptable levels, low internal noise levels and good thermal comfort control system listed in the two important which is the criteria of the usage of renewable energy savings, including also indoor environmental quality (Green Technology Financing Scheme 2015 & KeTTHA 2015).

In further support of this finding, Kiani et al., (2011) discovered the enhancement of thermal insulation when the glass's surface is modified with low emissivity coating and added an additional pane of glass. Scholars discovered that, the coating surface of the glass enervating important signals to pass through them (Munk 2005; Kiani et al., 2011 & Ullah 2012). The significant signals that are intended heavily involved in telecommunication systems and wireless internet. Hence, frequency selective surface (FSS) was proposed for the enhancement of low loss transmission signals (Munk 2005; Kiani et al., 2011; Ullah, 2012; Md Shukor et al., 2014a & Md Shukor et al., 2014b). With this enhancement, LLMTG with the combination of FSS improved the transmission an important signals and at the same time reduce radiation levels. Through this paper, we have developed the following research objectives:

1. To investigate the characteristics of user in Malaysia in adoption LLMTG as an innovation of glass technology in their building.
2. To identify the relationship between users' characteristics and the adoption of LLMTG among users in Malaysia.
3. To figure out the intentions of adopting low loss microwave transmission glass among users in Malaysia.

LLMTG is an innovation developed by the enhancement of new techniques of moderating solar thermal and the refraction of light has strengthened its characteristics as a suitable material for energy saving building. LLMTG plays an important role to materialise environmentally-safe building concept and to maximize useful transmission while minimise heat transfer and IR. There a few studies that concentrate on examining the energy savings when daylight while maintaining visual comfort and the impact of ESG which could minimize the cooling barrier and save energy consumption. (Tibi & Mokhtar 2014; Fasi & Budaiwi 2015). But LLMTG is a new type of window glass that uses an advanced FSS coating to improve thermal characteristics and decrease transmission losses (Md Shukor et al., 2014a & Md Shukor et al., 2014b). Here, LLMTG is designed so that substantial energy efficiency could be acquired and customers would benefit from the reduced cost.