Authors' affiliations

NAME: *Ayokunle Olubunmi Olanipekun[1]
Email: ayokunleolubunmi.olanipekun@hdr.qut.edu.au

NAME: Albert PC Chan[2]
Email: albert.chan@polyu.edu.hk

NAME: Paul Bo Xia[3]
Email: paul.xia@qut.edu.au

NAME: Olufisayo Adewumi Adedokun[4]
Email: fisayoadedokun@gmail.com

[1 & 3]Civil Engineering and Built Environment School, Science and Engineering Faculty, Queensland University of Technology, Brisbane, Australia.

[2]Department of Building and Real Estate, Hong Kong Polytechnic University, Kowloon, Hong Kong

[4]Federal University of Technology, Akure, Ondo State, Nigeria

Applying the self-determination theory (SDT) to explain the levels of motivation for adopting green building

Abstract

Adopting green building requires a lot of motivation due to the litany of challenges involved. Consequently, many previous studies have investigated the motivation for adopting green building. Insights from motivation theories from the field of psychology such as Goal-setting theory and Expectancy theory suggest that the previous studies emphasised only on the goal or intention of motivation. While this is correct, the motivation for adopting green building also encompasses "*levels of motivation"* based on another theory from the field of psychology - the self-determination theory (SDT) of motivation. Hence, what are the levels of motivation for adopting green building? What is the implication of the levels of motivation for the design of policy for motivating the adoption of green building? Through extensive literature review, this study uses insights from the SDT of motivation to answer these questions. By doing so, this study helps to form a newer understanding of the motivation for adopting green building. Specifically, this study provides the knowledge of the levels of motivation for adopting green building to individual and organizational level building stakeholders in the building sector, and how the public authorities can design policies to influence the respective levels of motivation.

Key words: Green building, self-determination theory, motivation, building sector, policy, review

1. Introduction

According to Dobson et al. (2013) green building has emerged as the guiding paradigm of physical development in the building sector, in order to reduce the adverse impact of the built environment on the natural environment (Li et al., 2014). However many challenges impede the express adoption of green building. These challenges include but not limited to difficult and complex project delivery process (Zhang et al., 2012), high capital and transaction cost of green building (Qian, Chan and Ghani Khalid, 2015) and sophisticated level of expertise required to fabricate and install green building features (Li et al., 2014; Perkins and McDonagh, 2012, Zhang et al., 2012). Therefore a lot of motivation is required to adopt green building (Cole, 2011). According to Dubose et al. (2007), motivation in the green building context refers to the drivers that compel the adoption of green building. In other words, the adoption of green building can be characterised as a motivation issue.

Many previous studies have investigated the motivation for adopting green building (e.g. Marker, Mason and Morrow, 2014; Wang, Toppinen and Juslin, 2014; Zhang, Shen and Wu, 2011; Qi et al., 2010; Qian and Lam, 2009). These can be categorised into different factors including economic/market factors, government/polity factors, moral factors, information/education factors and corporate factors. While this remains valuable contribution to the knowledge of motivating the adoption of green building, insights from many psychology theories of motivation such as the Maslow's hierarchy of needs and Herzberg's two-factor theory reveal that the previous have only the content of goal or intention at their core (Deci et al., 1991; Kelly, 2004; Curtis, 2010) - meaning that the previous studies were only concerned with factors that promote (or not) the adoption of green building. It is notable that the concept of motivation is founded in psychology – which explains human behaviour or actions (Popa et al., 2013), and as observed by Nurul Diyana and Zainul Abidin (2013), the adoption of green building is a psychologically motivated process – for instance, from the intention of a person or a group of people to forethought and to action.

However in addition to the core of goal or intention, further theoretical insights indicate that there are levels of motivation, and this is found in the self-determination theory (SDT) of motivation (Ryan, Rigby and Przybylski, 2006; Noels, Pelletier and Vallerand, 2000). According to SDT of motivation, the motivation for an action has different levels, and the difference in one level to another is the sense of choice, or sense of feeling free or the self-determination involved in the performance of an action by a person or a group of people (Amabile, 1993, Rigby et al., 1992). In no particular order, some of the levels of motivation are external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic motivation (Vallerand, 2004; Pelletier, Tuson and Haddad, 1997; Pelletier et al., 1995).

The problem is that no study has explicitly (if at all) identified and explained the levels of motivation for adopting green building despite the relevance. As observed by Healy (2015), this could result to missed opportunities in the effort to increase the adoption of green building in the building sector. Additionally, the use of right motivation, informed by the level of motivation, is critical to increasing the adoption of green building (Nurul Diyana and Zainul Abidin, 2013; Hakkinen and Belloni, 2011). Therefore, by extensive review of the literature, this study employed the SDT of motivation to explain the levels of motivation for adopting green building. By way of contribution, this study helps to form a newer understanding of the motivation for adopting green building.

In terms of structure, the framework for implementing the levels of motivation by building stakeholders for adopting green building is presented after the literature review. In this study, building stakeholders are the professional actors (e.g. architect, skilled trades, cost consultants etc.) and the non-professional actors (project owners, tenants etc.) that can affect, or are affected by green building in the building sector (Cole, 2011; Feige, Wallbaum and Krank, 2011). Building stakeholders also include various building sector organisations including contracting, consulting, developers, small scale companies and project owner organisations. Following the framework, the implications of the levels of motivation as they pertain to the policy making and the processes involved, for motivating building stakeholders to adopt

green building are presented. Finally, the conclusion is made, and recommendations and area of further research are proposed.

2. The concept of green building

Green building is a form of physical development, based on the principle of sustainable construction; it involves the creation of built products with clean best-practices and resource-efficient methods from the extraction of raw materials to the demolition and disposal of its components. (Hwang and Tan, 2012; Ojo, Mbowa and Akinlabi, 2014). Furthermore, it employs techniques, strategies and construction products that use fewer resources than conventional construction (Circo, 2008; Hoffman and Henn, 2008). In practice, green building involves merely doing without extra space, finishes, or appliances; it also involves substituting a less polluting product for more polluting ones (Hoffman and Henn, 2008). Additionally, it involves the use of more integrated strategies. It may also be the reconfiguration of a space to take advantage of unique site attributes (e.g., facing glass toward the sun path to use natural or passive solar heat gain instead of using natural gas or electricity to heat a space), or reconfiguring design parameters to take advantage of building system synergies (e.g. downsizing the boiler after extra insulation has been added to the exterior shell) (bin Esa et al., 2011; Hoffman and Henn, 2008). Therefore, green building contributes to economic and social development, as well as environmental protection (Ahn, Pearce and Wang, 2013).

Given the contributions, there is increasing development of green building projects globally. For instance in the US, between 2000 and 2004, 192 green building projects were built according to the record of the United State Green Building Council (USGBC) (USGBC, 2015). Five years later, the number of green building projects had increased to 4,912, or 96.06% increment. In the following five years, the number of green building projects stood at 30,068 or 83.66% increment. In Australia, Figure 2 shows that number of green building projects rose from just one in 2004 to over 300 in 2014 (GBCA, 2014).

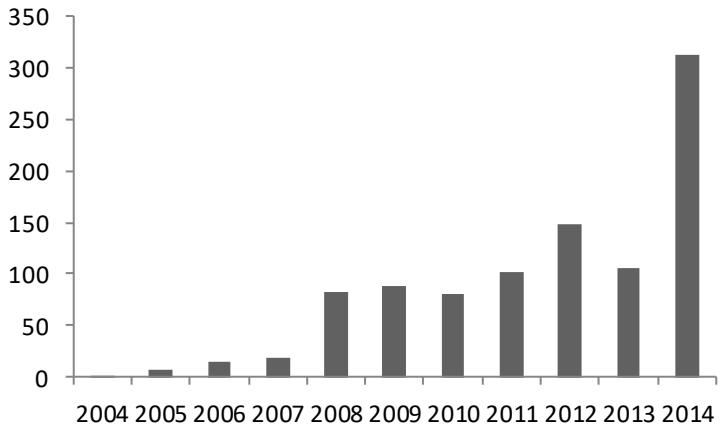

Figure 2: Demand for green building projects in Australia
Source: (https://www.gbca.org.au/project-directory.asp)

Across the globe, the World Green Building Trend Market Report in 2016 reveals substantial increase in demand for green building projects in many countries. For instance, the study revealed that emerging economies like Brazil, India, Saudi Arabia and South Africa will be engines of green growth in the next three years, while expansion will continue in developed countries like the US, Germany and the UK (Buckley and Logan, 2016). In terms of built space, Environmental Leader (2015) found that the construction of green building projects rose to 325 million square meters of new floor space in 2013. Additionally, the cumulative green building project space, declared to have been certified green as of June, 2010, includes 6 billion square feet, and will reach about 53 billion square feet by 2020 (California Green Solutions, 2015).

Because of the increasing number and built space, the economic value of green building projects has become substantial. The World Green Building Council (2013a) valued the green building sector in the US to be half-trillion dollar in 2013. In the same year, the study of Environmental Leader (2015) revealed that the global green building market is valued at US$260 billion. This is however short of the estimate of the World Green Building Council (2013a), which valued the same market to be over one trillion dollar. Another report (Illustrated in Figure 3) projected the revenue from green building sector from 2012 through 2017. It was revealed that green building sector generated the revenue of approximately $156.12 billion in 2014, expected to rise to $287.87 billion in 2017 (IBISWorld, 2015). This account gives more credence to the motivation for adopting green building.

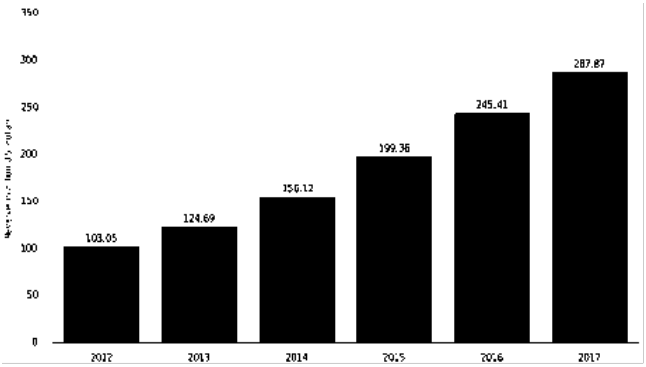

Figure 3: Projected revenue from the green building sector from 2012 through 2017 (in billion U.S. dollars)
Source: IBISWorld (2015)

3. Motivation for adopting green building: Previous studies

Many studies have empirically investigated the motivations for adopting green building in the building sector, and these are categorised into different factors (Table 1). The first is the economic/market factors, which refer to the economic gains and high commercial potential of green building projects (Li et al., 2014; Marker et al., 2014; Love et al., 2012; Zhang et al., 2011; Chan et al., 2009). The second is the governmental/polity factors, which refers to the intervention of the government towards promoting the adoption of green building through either the force of the law (mandates and legislations) (Abidin and Powmya, 2014; Wang et al., 2014; Qi et al., 2010), or various voluntary programs such as incentives (Wang et al., 2014; Zhang et al., 2011). The third is the moral factors, which relate to the persuasion from green advocates, champions or leaders (Dubose et al., 2007) or inspiration by the worsening state of the environment and ecosystem (Abidin and Powmya, 2014; Gou, Siu-Yu Lau and Prasad, 2013), while the fourth is the information/education factors. This suggests increased level of green awareness, especially through the rating certifications, that translate to the adoption of green building (Zhang et al., 2011; Qi et al., 2010; Potbhare, Syal and Korkmaz, 2009). The last is the corporate factors, which represent the motivation for adopting green building or green practices at the corporate organizational level. They are usually embedded as part of organizational vision and goals, strategies for reputation and image building, social responsibility and organizational resources (Abidin and Powmya, 2014; Love et al., 2012; Zhang et al., 2011).

Notably, these factors of motivation have only the content of goal or intention at their core. That is, the emphasis is on the direction of actions in terms of which factor (motivator) lead to the achievement of a goal or the performance of an action. For instance, in a case study of a green office building in Western Australia, Love et al. (2012) revealed that the prospect of financial gain is one of the motivations for the project. Similarly, a survey of building designers in Hong Kong and Singapore revealed that economic forces and government interventions are two most important factors motivating adopting green building

(Chan, Queena and Lam, 2009). In both instances, the direction leading to the goal of green building are both economic and governmental factors. Within the green building context, this emphasis aligns with many psychological theories of motivation such as Maslow's hierarchy of needs, Herzberg's two-factor theory, Goal-setting theory, Expectancy theory etc., where the major emphasis is the direction of actions, or the factors (motivators) leading to desired outcomes or goals (Curtis, 2010; Kelly, 2004; Deci et al., 1991). While this remains valuable by providing the understanding of motivation within and without the green building context through decades of research, an additional emphasis is the level of motivation for achieving an outcome or a goal. This is found in the SDT of motivation (Ryan and Deci, 2000a) but yet unexplored in forming the understanding of the motivation for adopting green building.

4. Applying the Self-determination theory (SDT) of motivation to explain levels of motivation for adopting green building

The self-determination theory (SDT) of motivation, a psychology theory, proposes that the motivation to perform an action varies in amount or level – and the difference in one level to another is the sense of choice, or the sense of feeling free or the self-determination involved in the performance of the action (Ryan and Deci, 2000a; Amabile, 1993). For instance, the level of motivation of a developer that develops some green building projects, or inculcates certain green features in building projects because it will improve the flagship or the brand of the developer in the market place is different from the level of motivation of the developer that performed the same action because of stringent government mandates or regulations. The level of motivation in the former reflects a case of personal endorsement and a feeling of choice on the part of the developer, while the latter reflects a case of compliance with an external control. Hence the level of motivation in the former is more autonomous, or more self-regulated, while latter is controlled or externally regulated.

Despite the difference in the levels of motivation, the actions performed by the developer in both examples above are of instrumental value to achieving separable outcomes of flagship and brand in the marketplace or avoiding sanctions for not following government mandates or regulations. When an action is performed or carried out as a result of its instrumental value, it is regarded as extrinsic motivation (Gagne and Deci, 2005). This contrasts intrinsic motivation - which refers to the performance of an action by a person or a group of people out of volition or personal endorsement (Ryan and Deci, 2000a). At the same time, intrinsic motivation corresponds to the performance of an action because it is interesting or leads to spontaneous satisfaction (Gagne and Deci, 2005; Vallerand, 2004). Therefore the prospect of a reward or sanction does not stimulate an intrinsic action. As pointed by Amabile (1993), intrinsic motivation does not manifest because of some separable outcomes such as rewards, external prods or pressures, hence it is regarded as the least controlled motivation or the most self-regulated (Babiak and Trendafilova, 2011).

From the description above, intrinsic and extrinsic motivated actions differ in their regulation process, yet both are instances of motivated actions or actions that goes with intention (Deci and Ryan, 2000a). This means there is a purpose for either of intrinsic and extrinsic motivated actions. In contrast, amotivation is the performance of an action without clear understanding or sense of purpose (Pelletier et al., 1997). As green building represents a change concept from conventional building practice in the building sector, this study argues that the adoption of green building is not without motivation or intentionality. Therefore amotivation is expunged from this study. Additionally, according to Gagne and Deci (2005), the levels of motivation as proposed by SDT of motivation is a self-determination continuum (Figure 1). In ascending order of self-determination, this ranges from amotivation (expunged), to external regulation, introjected regulation, identified regulation, and integrated regulation. These are categorised as extrinsic motivation (Gagne and Deci, 2005), and they vary in the degree to which it is autonomous or self-regulated (Ryan and Deci, 2000a). The last on the range is the intrinsic motivation (Vallerand, 2004). Therefore the broad categorization of the self-determination continuum include amotivation (expunged), extrinsic and intrinsic motivations.

Table 1: Summary of empirical studies on the motivation for the adoption of green buildings

Categories of motivation for the adoption of green building	Reference sources																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Economic/market factors																		
Lower energy costs	✓✓		✓✓					✓✓	✓✓									
Lower life-cycle costs (especially operation costs)	✓✓		✓✓	✓✓	✓✓						✓✓							
Superior performance of green building/specific needs									✓✓									
High market demand for green buildings/Low vacancy				✓✓													✓✓	
Competitive advantage/differentiation of green projects in the market							✓✓				✓✓							
Higher tenant satisfaction and productivity			✓✓	✓✓														
Greater availability and affordability of green building technology and knowledge							✓✓								✓✓			
High financial returns				✓✓							✓✓							✓✓
Government/polity factors																		
Government mandates and legislation	✓✓		✓✓		✓✓	✓✓	✓✓								✓✓			
Government programmes								✓✓		✓✓	✓✓	✓✓	✓✓	✓✓		✓✓	✓✓	
Moral factors																		
Worsening environmental conditions (Moral persuasion)	✓✓		✓✓		✓✓													
Pro-environmental beliefs							✓✓											
Information/education factors																		
High environmental literacy							✓✓						✓✓		✓✓	✓✓		
Industry rating system																✓✓		✓✓
Corporate factors																		
Organisations' vision and goals	✓✓		✓✓															✓✓
Corporate social responsibility				✓✓	✓✓													
Reputation					✓✓													✓✓
Organisational resources and readiness											✓✓						✓✓	

(1- Chan et al., 2009; 2-Dobson et al., 2013; 3-Gou et al., 2013; 4-Marker et al., 2014; 5-Abidin and Powmya, 2014; 6-Qi et al., 2010; 7-Wang et al., 2014; 8-Liu et al., 2012; 9-Ahn et al., 2013; 10-Feige et al., 2011; 11-Zhang et al., 2011; 12-Tinker et al., 2006; 13-Potbhare et al., 2009; 14-Berry et al., 2013; 15-Li et al., 2014; 16-Ganguly et al., 2013; 17-Lee, 2008; 18-Love et al., 2012)

Along the self-determination continuum of the SDT of motivation, it is possible for the motivation for the performance of an action to shift from a lesser self-determined level e.g. integrated regulation, to a more self-determined level e.g. intrinsic motivation, through the process of internalization and integration. Internalisation is the process of taking in a control or regulation to become more integral to oneself (Deci and Ryan, 2000), while integration is the process by which a person or a group of people more fully transform a control or regulation into their own so that it will emanate from their sense of self (Ryan and Deci, 2000a). For instance, a developer who installs green features in a building so as to benefit from government incentives, and after some time, performs the same action of installing green features in a building because he has identified with the importance of the action and accepted its regulation as his own. In the latter case, the developer has both internalized and integrated the installation of green features in a building to become something he identified with (identified regulation) such that there is no need for external regulation of government incentive as it was in the former. According to Vallerand (2004), the shift towards the more self-determined levels of motivation is consequential leading to more positive outcomes than the least determined levels of motivation.

Additionally, the motivation for the performance of an action does not necessarily need to progress through internalisation and integration with respect to each level of motivation (Ryan and Deci, 2000a). Rather, an action performed by a person or a group of people can be regulated by any of the levels of motivation in a non-progressive manner (Gagne and Deci, 2005). For instance, a developer can adopt green building development because of government incentives (external regulation), and the action can expose the developer to the intrinsically interesting properties of green building, thereby causing an orientation shift (intrinsic motivation). Thus, internalisation and integration in the continuum of the SDT of motivation is neither a stage theory nor rigidly developmental. The following section describes each of the levels in the continuum of the SDT of motivation and how they explain the adoption of green building.

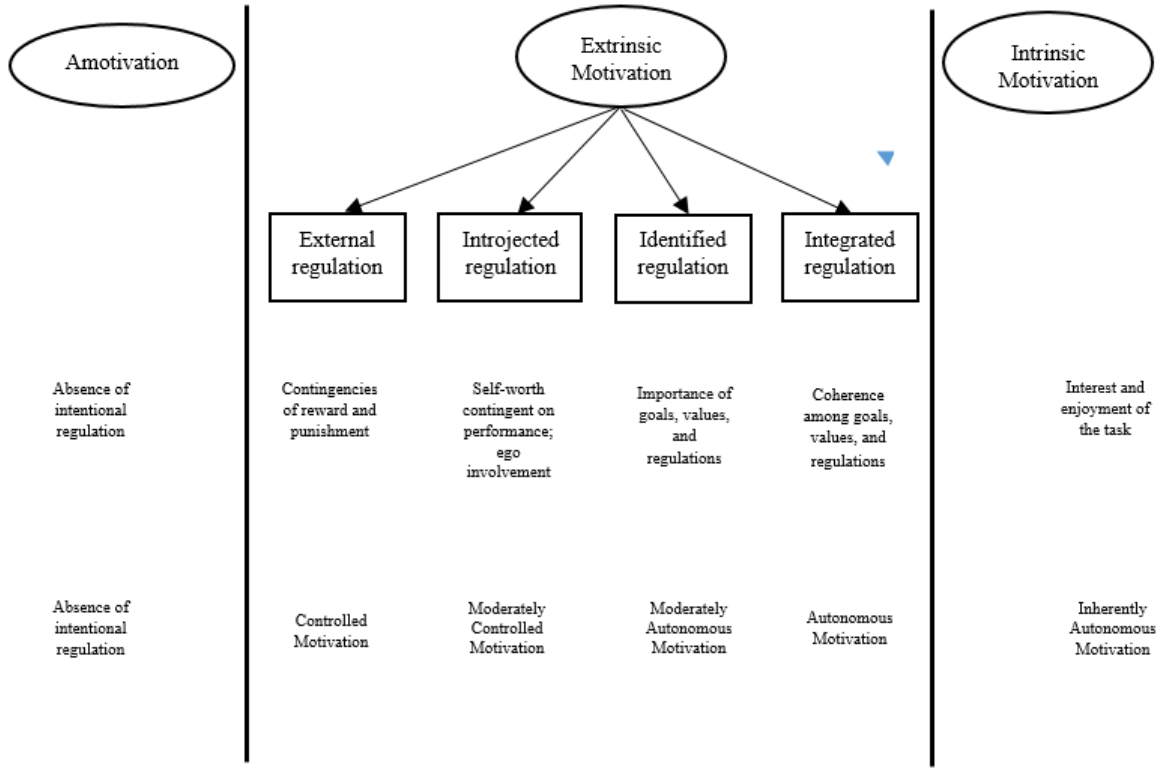

Figure 1: The self-determination continuum of the levels of motivation
Source: (Gagne and Deci, 2005)

4.1 External regulation

The externally regulated level of motivation corresponds to the actions performed in order to attain some separable outcomes that are external to the actions performed such as the offer of a reward or threat of a punishment (Vallerand, 2004; Guay, Ryan and Deci, 2000a; Vallerand and Blanchard, 2000; Vallerand, Fortier and Guay, 1997; Deci et al., 1991). Hence it is the least self-determined level of motivation (Barkoukis et al., 2008; Ryan and Deci, 2000a; Vallerand and Losier, 1999; Pelletier et al., 1995). As evident from previous studies, adopting green building is mostly an externally regulated motivation. Many building stakeholders adopt green building projects for separable outcomes such as financial gains and compliance with different forms of government interventions (Wang et al., 2014; Nurul Diyana and Zainul Abidin, 2013; Zhang et al., 2011; Chan et al., 2009). Particularly government interventions, it is very dominant due to the role of the government as the significant building investor and user (Circo, 2008). The intervention of the government include the use of the force of the law through various legislations and executive orders to mandate the adoption of green building practices (Abidin and Powmya, 2014; Wang et al., 2014; Samari et al., 2013; Qi et al., 2010). In corroboration, Qi et al. (2010) revealed that government regulations are the main motivation for adopting green practices by Chinese contractors. The government intervention can also be the provision of incentive programs and policies (Wang et al., 2014; Zhang et al., 2011), which have been strongly instrumental to motivating the adoption green buildings by building sector stakeholders in many countries (Cidell and Cope, 2014; Liu and Xu, 2015; Lee and Koski, 2012).

4.2 Introjected regulation

The introjected regulation actions are the actions performed through internal pressures that are contingent on self-esteem, meaning that introjected regulated actions are performed by a person or a group of people out of the feeling of pressure in order to avoid guilt or anxiety to attain ego-enhancements or pride (Ryan and Deci, 2000a; Pelletier et al., 1995). Therefore, introjection regulation actions are experienced as partially part of the self of the person or the group of people performing the action(s) (Ryan and Deci, 2000a), and is often regarded as pressured action (Ryan and Deci, 2000a ; Vallerand and Losier, 1999). Previous studies such as (Zhang et al., 2011; Fiedler and Deegan, 2007) revealed that developers' motivation for adopting green buildings are ego enhancement and pride. Additionally, Babiak and Trendafilova (2011) revealed that 43% of executives in a sport-based organisations felt that being viewed as a 'good citizen' was one of the most influential motivations for addressing environmental issues. For introjected regulation actions, the level of motivation is not as externally regulated as in the external regulation. The formerly external source of motivation has become partially internalized such that its presence is no longer required to perform actions (Vallerand, 2004; Hayamizu, 1997; Vallerand et al., 1997; Pelletier et al., 1997; Pelletier et al., 1995). In a case study by Boyle and McGuirk, 2012, they revealed that an executive partner of a global firm once reiterated that separable outcomes such as energy cost savings is not the main motivation for adopting green building. Rather, the ego-desire to become global leader in sustainability and corporate social responsibility is the main motivation (Nurul Diyana and Zainul Abidin, 2013; Boyle and McGuirk, 2012).

4.3 Identified regulation

This level of motivation means that a person or a group of people are motivated to perform an action because they have identified with the importance of such action and thus accepts its regulation as their own (Vallerand, 2004). Therefore identified regulation actions are more autonomous or self-determined than introjected regulated actions (Ryan and Deci, 2000a; Deci et al., 1991). This level of motivation can be experienced with increased knowledge about value, importance and benefits of green building. With more knowledge, building stakeholders are able to identify with green building (Samari et al., 2013; Corbett and Muthulingam, 2007), and at the same time raising their willingness to adopt green building practices (Ganguly et al., 2013; Lee, 2008). For instance, both Wang et al. (2014) and Samari et al. (2013) revealed that building stakeholders who are educated, and also identified with the concept of green

building, are able to adopt green building more easily. Similarly, Chau, Tse and Chung (2010)'s study revealed that the users of green building in Hong Kong have more knowledge of the benefits, values and importance. As a result, the users are able to identify with green building and more willing to pay for it in Hong Kong (Chau, Tse and Chung, 2010). Although the self-determination in actions motivated by identified regulation is high, green building is still adopted for its instrumental value, such as the value and importance of green building (Hakkinen and Belloni, 2011).

4.4 Integrated regulation

Integrated regulation is when identified regulation has been fully assimilated to the self through self-examination and bringing new regulations into congruence with one's other values and needs (Ryan and Deci, 2000a). Therefore actions motivated through integrated regulation closely aligns with personal values of the actor, or organizational values in case of corporate and non-corporate organisations (Barkoukis et al., 2008; Pelletier et al., 1995). At the same time, integrated regulation means that an action is not performed for their importance or value (as it is with identified regulation), but because it is consistent with the self-schemas the actors possesses (Pelletier et al., 1997). For instance according to Wang et al. (2014), in the UK building sector, many building stakeholders exhibit as personal value, a high level of environmental consciousness, and this has been their major motivation for adopting green practices. At the organizational level, integrated regulation green building practices are prominent. Mostly, sustainability becomes ingrained as organizational culture, values, norms, operations, beliefs and leadership because of consistent practice over a period of time (Richardson and Lynes, 2007; Jain and Kaur, 2004). These attributes therefore form the motivation for adopting green building. For instance, Love et al. (2012) revealed that a client organisation in Western Australia was able to develop a high rated green building because it conforms to the value of the company to achieve at least the minimum Green Star rating in its building development. Kua and Lee (2002) also revealed that the motivation for the development of Green Mark projects in a designer company in Singapore is the green culture of the company. Although it appears to be choiceful, integrated regulation actions are still performed for their instrument values (Barkoukis et al., 2008; Ryan and Deci, 2000a; Pelletier et al., 1995), such as culture, values, and norms.

4.5 Intrinsic motivation

Intrinsic motivation is the highest self-determined level of motivation along the self-determination continuum of the SDT of motivation because they emanate from the self and are fully endorsed (Deci et al., 1991). This is the distinction of intrinsic motivation from other levels of motivation. As insinuated previously, an action is intrinsically motivated when it is performed out of volition or personal endorsement (Ryan and Deci, 2000a), which leads to a sense of pleasure, positive experiences and satisfaction for the actors (Barkoukis et al., 2008; Pelletier et al., 1997). Often green building enthusiasts exemplify the environmental attitudes, and/or counterculture bio-centric activism – which is the perception that they are integral part of the natural environment (Aliagha et al., 2013; Moganadas et al., 2013; Chen and Chai, 2010; Woodruff et al., 2008). According to Tan (2014), this creates a feeling of satisfaction or pleasurable experience for the actors. An example is in Malaysia where consumers felt positive about selecting green products (Chen and Chai, 2010).

5. Proposed framework of the levels of motivation for adopting green building

From the literature review, the five levels of motivation for adopting green building are identified and described. Notably, it can be observed that the "*what*" of motivation is consistent. The "*what*" of motivation, or what is the subject of motivation, in this study is green building. Similarly, there are two "*who*$_s$" of motivation. The first "*who*" of motivation, or who is being motivated to adopt green building include are individual level actors such as contractors, consultants, tenants, developers and project owners. The second "*who*" of motivation are organizational level actors such as contracting and consulting organisations in the building sector, developer companies, small scale supplier companies and

project owner organisations. Although individual and corporate level actors are represented on the framework illustrated in Figure 2, they are reduced to *"building stakeholders*" in other parts of this study.

Based on the SDT of motivation, the five levels of motivation are different from one another in terms of the level of self-determination involved to adopt green building (Amabile, 1993). Therefore building stakeholders can be on any of the five levels of motivation to adopt green building, whereby each level corresponds to a specific level of self-determination. Additionally, while the level of self-determination for each level of motivation varies, it is possible to shift progressively from one level of motivation to another in the adoption of green building (Deci and Ryan, 2000). Building stakeholders can therefore shift progressively from one level of motivation, usually of a lesser level of self-determination, to another level of motivation of a higher level of self-determination. In contrast, the motivation for adopting green building can shift from one level of motivation to another in a non-progressive manner (Ryan and Deci, 2000a). Thus building stakeholders can shift from a level of motivation of a lesser level of self-determination to another level of motivation of a higher level of self-determination in a non-progressive manner.

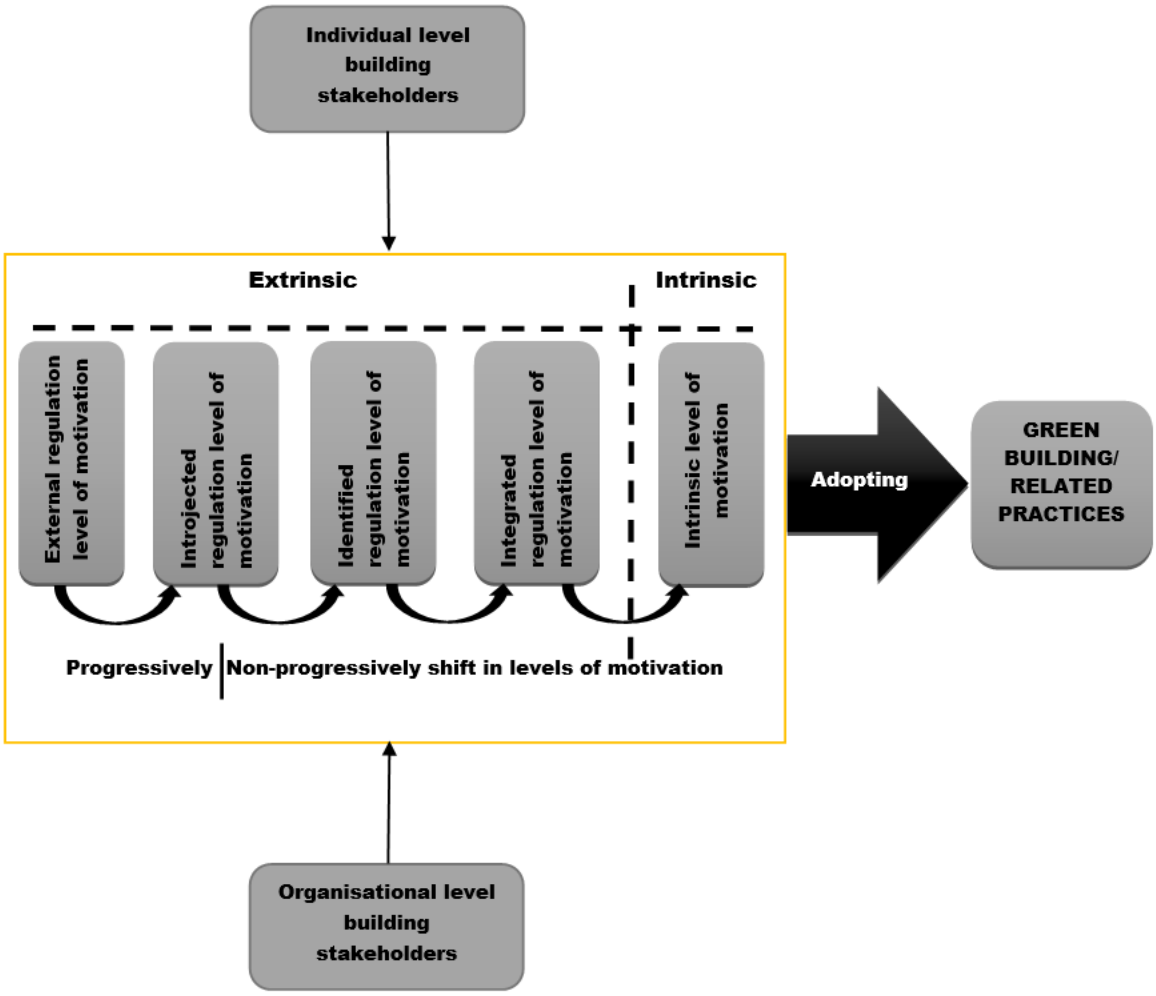

Figure 1: Illustration of the framework of the levels of motivation for adopting green building

6. Implications for policy making

Policy making for effecting desirable changes that promote green building remains crucial. According to Pearce, Dubose and Bosch (2007), the design of policies and programs aimed at motivating the adoption of green building is a crucial consideration that determines the level of policy or program success. Thus

the insights from the levels of motivation as proposed in the SDT of motivation can guide the design of strategies and policy interventions to improve building stakeholders' adoption of green building (Olanipekun, 2016). The area of focus is the introduction of some form or structure to the process of designing policies for motivating the adoption green building through the identification of building stakeholders' level of motivation, and also, solutions that seeks to encourage the more self-determined levels of building stakeholders' motivation. Since differences exist in the levels of motivation, especially in terms of the separable outcomes that regulates each of the levels of motivation (Rigby et al., 1992), policy interventions should be designed to focus independently on each of the levels of building stakeholders' motivation so as to ensure more effectiveness (Potbhare et al., 2009). Designing policies for each of the levels of motivation of building stakeholders suggests a non-holistic approach to policy design for motivating the adoption of green building. This aligns with previous approaches used for designing policies for motivating the adoption of green building. For instance, policy interventions for motivating the adoption of green building have been designed to reflect the local, state and federal levels of government in many countries (Lee and Koski, 2012; Circo, 2008; Sentman, Del Percio and Koerner, 2008; May and Koski, 2007; Theaker and Cole, 2001), while they have also been designed to reflect different professional status in the building sector (See Dobson et al., 2013; Tinker et al., 2006).

During the process of policy design, policy makers may, as a first step, identify the levels of motivation of building stakeholders who are the target of policy interventions, through interviews and/or surveys to uncover their dominant level of motivation (Seeliger and Turok, 2015, Zhao et al., 2015). Longitudinal observations and experiments can also be used to achieve this objective (Liu et al. (2012). By identifying the dominant, or the respective levels of motivation of targeted building stakeholders', policy makers can thus be more specific about the type of policies to design and implement for motivating the adoption of green building. Additionally, and particularly for building stakeholders whose levels of motivation are less self-determined, thereby requiring tangible motivators such as financial benefits, policy makers are able to design policies that conveys the right quantity or measure of motivators. In this manner, public accountability is justified in terms of prudent administration of policies for motivating the adopting of green buildings (Pearce et al., 2007).

In the public space, the less self-determined levels of motivation carries tangible motivators which are costly to implement and also time consuming (May and Koski, 2007). Because of this, the feasibility of implementing these instruments by various public authorities is a subject of constant debates and disagreements among policy makers (Circo, 2008; May and Koski, 2007). Policy interventions should therefore be aimed at shifting the less self-determined levels of motivation to a more self-determined levels of motivation (e.g. identified regulation, integrated regulation and intrinsic motivation). In more practical sense, as values, principles, culture and norms correspond to instruments that regulate the more self-determined levels of motivation, policy interventions should be tailored to elevate these instruments in building stakeholders (Huang et al., 2014). This is important as research has shown that these sort of instruments are potent for motivating the adoption of green building (Attaran and Celik, 2015; Hasengwa, 2008).

Furthermore, policy making aimed at the more self-determined levels of motivation of building stakeholders can be actualized strategically. Policies can be a form of compulsory "sustainability" education or training of building stakeholders prior to their entry into green building practice. For instance, developers can be required to undergo compulsory training on best practices that promote sustainable construction as a condition for bidding for building contracts. Additionally, professionals in the building sector can be required as a matter of compulsion to undergo similar training before being licensed to practice. Policies of this nature should be targeted for the longer term through legislation – which is a more permanent means of instituting policies (Dubose et al., 2007). By being strategic as pointed above, there is a longer term benefit that building stakeholders are progressively acculturated to green building practices. According to Schelly et al. (2012), acculturated adoption of green building by

stakeholders within and outside the building sector conforms to the more self-determined levels of motivation e.g. integrated regulation.

Additionally as a form of strategy, policies making to achieve the more self-determined levels of motivation should aim to encourage building stakeholders to form a community, under a uniform agenda (relating to green building), and as agents of change. The implementation of such policy on the part of public authorities can be in form of demonstration projects which serve to bring together a community of building stakeholders (Berry et al., 2013). More so that previous studies have shown that community participation of building stakeholders encourages the more self-determined levels of motivation (Moganadas et al., 2013; Schelly et al., 2012; Sadeghi-Tabrizi, 2010; Hasengwa, 2008). Thus, as participants of such community, building stakeholders consider it a moral and value adaptation to engage in green building practices, rather than for extrinsic benefits (Sadeghi-Tabrizi, 2010). Finally, within such community cluster, role models or mentors – who are the more active participants, usually provide necessary guides and mentoring to other less active participants to the extent that it becomes moral to adopt green building practices (Moganadas et al., 2013).

7. Conclusions, recommendations and future research

As a motivation issue, the adoption of green building has only been viewed from goal or intention perspective. While the adoption of green building can also be viewed from "levels of motivation" perspective, there is currently no explanation about this subject in the literature. Therefore this study, through extensive literature review, employed a psychological theory, the SDT of motivation to explain the levels of motivation for adopting green building. The study concluded that there are five levels of motivation for adopting green building, and the difference in one level to another is the level of self-determination involved. In an ascending order of self-determination, the levels of motivation for adopting green building are external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic motivation. On this basis, a framework of implementation of the levels of motivation for the adoption of green building is presented and illustrated. The policy implication of findings is also presented. The findings implicate policy making, and the processes involved, for motivating building stakeholders to adopt green building.

To building stakeholders such as individual developers, tenants, project owners, professional contractors, consultants and suppliers in the building sector, they should evaluate their levels of motivation in order to have knowledge of it. With such knowledge, they can improve on respective levels of motivation, for instance, from a less self-determined level to a more self-determined level. Similarly, for building sector organisations, they should also evaluate their level of motivation, and with the knowledge, they can be able to adopt green building with the right motivation. The policy makers, who are public authorities should explore and understand the respective levels of motivation of the target beneficiaries of their policies. By doing so, policies can be more appropriately and correctly designed to address the motivation of building stakeholders with different levels of motivation.

The SDT of motivation is well grounded with about three decades of research, many of which have provided valuable insights into the concept of motivation in different spheres like educational learning, sports, employment etc. In the building sector, further insights can be generated by validating the levels of motivation proposed by SDT of motivation empirically from the views of building stakeholders of different classes. This will provide quantifiable information on the levels of motivation of respective building stakeholders that are targets of policy interventions aimed at motivating the adoption of green building. For more generalization, there is need to validate the usability and effectiveness of the proposed framework by utilizing it in real life situation.

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