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Green Tax Incentives and Other Demand Factors Motivating Green Commercial Property Investment

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Abstract In this study, we seek to identify and model the motivating factors that influence developers' and investors' decisions to invest in green commercial properties using structural equation modeling methods. Specifically, we model the effects of green building skills and green tax incentives on demand factors influencing green commercial property investment. The study is based on a survey of 350 real estate developers in Malaysia. The results show that monetary green tax incentives and green skills have significant casual effects on demand. Among these, personal and altruistic environmental motivations, corporate conscience responsibility motivations, and economic and financial motivations are significant. Green tax incentives, however, are found to have the most significant effect on green commercial property demand and investment.

There is a general understanding among those knowledgeable with the subject matter that green building investment offers a path to environmental impact mitigation and reduction in energy use and consumption (Miller, Pogue, Saville, and Tu, 2010; Aliagha, Maizon, Afeez, and Ali, 2013; Chequt, Eichholtz, and Kok, 2014; Kok, 2014). Whereas the process is complex and by no means explicit, the understanding is however based on the large environmental and socioeconomic footprint of green building, especially when considering the high reliance on energy and water saving, as well as reduction in the operating cost. In the meantime, we have evidence that the value of a building can be connected to the building's apparent level of sustainability (Miller, Pogue, Gough, and Davis, 2009; Reed, Bilos, Wilkinson, and Schult, 2009; Kok, 2014). In addition, Chequt, Eichholtz, and Kok (2014) show that green building investment is situated within the marketplace that is influenced by many other forces of demand and supply, where the stakeholders include the real estate development team, building owners, and tenants etc. They observe that attention to sustainability and energy efficiency in green building has gradually shifted to building owners, tenants, and investors who are considered to represent conduits for achieving energy efficiency in building investment.

While we agree that this shift in perception is gradually moving the green property market towards increased levels of energy efficiency and sustainability, we equally add that stakeholders in the green building industry are not fully aware or less certain of the motivating factors and benefits of green building. Whereas debates on the environmental benefits of green building are gradually becoming less contentious, the pressing concern for potential occupants and investors in green building are buildings that can reduce environmental footprints, energy use, and operational costs, enhance employee productivity, and promote a collaborative and innovative workplace while at the same time achieve core rental profit and values (Miller, Pogue, Gough, and Davis, 2009; O'Mara, 2012; Chequt, Eichholtz, and Kok, 2014; Nurick et al., 2015).

On the other hand, the top building related issue that worries society most is the growing evidence that the building sector is a major consumer of resources and energy, accounting for about 44% of society's total material use and more than 50% of primary resources (Nelms, Russell, and Lence, 2005). For example, energy consumption by building in Canada, United Kingdom, and the United States is 30%–50% of the country's total energy demand (Nelms, Russell, and Lence, 2005). Commercial properties contribute significantly to this resource demand. Commercial buildings (offices, retail, and industrial) consume close to 20% of the total energy consumption (Kroll, 2011). Indeed, we have observed increases in green commercial building investment and demand. A green building (also known as green construction or sustainable building) whether residential or commercial refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle (Kriss, 2014). Green building development and lifetime operation offers the healthiest conceivable environment while guaranteeing the most productive and least disruptive use of land, water, energy, and resources (Governor's Green Government Council, 2010). While there are many different definitions of green building, it is generally accepted as the planning, design, construction, and operation of buildings with foremost consideration of energy use, water use, indoor environmental quality, material selection, and the building's onsite effects (Kriss, 2014).

The concept of green building we largely believe underscores investment in environmental and eco-friendly property for the purpose of achieving environmental, social, and economic benefits. However, green building demand and investment is still low despite the availability of the market (Nazriah, 2010; Aliagha, Maizon, Afeez, and Ali, 2013; Yudelson, 2016). This situation may in part be due to prospective investors and users who are not completely mindful or still less sure of the expected returns for green building, which may include non-quantitative returns. For example, a prospective environmental risk-averse client or tenant would be more likely to demand sustainable building if he is aware of the driving benefits accruable from it.

Studies show that investors who are knowledgeable about the factors that motivate green building are more likely to realize greater benefits and market returns on green investment (Miller, Pogue, Saville, and Tu, 2009; Alev and Baabak, 2010; Nurul and Zainul, 2013; Kok, 2014). Thus, knowledge could motivate more green

building demand and be a good step towards avoiding harmful activities on the environment while improving the social and economic welfare of investors. For example, occupants and investors are likely to demand green building due to their belief that climate change is real and should be mitigated (Aliagha, Maizon, Afeez, and Ali, 2013).

To what extent are investors and occupants aware and knowledgeable about social and economic drivers of green building? Recent studies on green building seem to focus on green residential buildings (Christopher, 2007), government and institutional green buildings (Shahamir and Zakara, 2014), and energy efficiency (NgBan and Zainal, 2013). Although green commercial properties are gradually becoming areas of research interest, studies focusing on green commercial properties (Wade, Petty, and Ramsay, 2003; Fuerst and McAllister, 2009; Miller, Pogue, Saville, and Tu, 2009; Chequt, Eichholtz, and Kok, 2014) seem to focus mainly on green building certification, energy efficiency, eco-labelling, green building, and productivity without specific attention to the interdependent factors that underlie the demand for green commercial property investment.

Moreover, studies that examine the correlations among the green demand drivers appear to be few (Numraktrakul, Ngarmyarn, and Panichpathom, 2011; Mohd, Milad, and Nariman, 2013). Investors and stakeholders are not only interested in correlations but also which variables such as monetary green tax incentives and available green skills have the most causal effects on the nature of demand for green building factors. Investors and consumers seem to be naïve or skeptical, otherwise there would be more green building demand by now. Developers seem even less certain of the economic, environmental, and social benefits from green building. Against this backdrop, we argue that if commercial green building makes environmental, economic, and social sense as acknowledged by experts, which factors and influences are most important? As such more empirical studies that focus on the demand factors of green commercial property investment is required. It is our contention and opinion that investigations into the area will benefit investors, developers, and other stakeholders involved in green building development. Thus, the objectives of this study are: (1) identify and validate the factors that could affect the demand for green commercial property investment and (2) determine the causal effect of monetary green tax incentives and available green skills on personal and altruistic environmental motivations, corporate conscience responsibility motivations, and economic and financial motivations in relation to green building demand and investment.

Review of Related Theory and Literature

Related Theory on Decision to Demand Green Building

Social cognitive theory (SCT) is one popular behavioral theory that can be used to explain the decision and motivation to invest in green building. SCT is a psychological model used to explain the motivations, expectations, forethought, desires, and responsibility that could prompt and direct an individual's activity. As it concerns green building demand and investment, SCT holds that before

investors become involved in green building for any reason or purpose, they are motivated by certain factors. However, motivation is dependent on the aim and benefits identified through the thought process particularly when the knowledge of green building is an emerging concept (Nurul and Zainul, 2013). For instance, if investors envision the presumable results of an impending environmental disaster, they will set objectives and plan a course of action that is likely to protect their immediate surroundings by going green.

Nevertheless, the reality of climate change has increasingly dominated the campaign and motivation for more investment in green building. Thus, investors with the right motivations and expectations are attracted to green building based on personal or altruistic environmental reasons, social or corporate conscience responsibility, and/or financial or profit maximization. Moreover, SCT scholars have argued that investor incentives such as tax credits, loans or grants and subsidies, tax abatement, property tax credits, low capital gains, and/or low stamp duties could motivate investors to invest in green building. Government capacity to incentivize green products woo investors to demand green buildings (Nurul and Zainul, 2013).

Factors that Motivate Investors to Commit to Green Building

Personal and Altruistic Environmental Motivations

Environmental altruism is providing or participating in ecological activities to gain internal and self-reward instead of external reward (Baston, 2008). By this definition, we argue that an environmental risk-averse consumer's decision to be comfortable and avoid imminent ecological hazards could be based on personal and altruistic motivations. Also, we have evidence that pro-environmental concern based on altruistic motivation and perception advocates for green buildings that minimize the consumption of large resources such as water, energy, and materials while improving the thermal and acoustic environment of a building (Singh, Syal, Grady, and Korkmaz, 2010; Roa et al., 2012). Furthermore, green building that minimizes solid waste and maximizes the safety, health, and quality of life of the occupants is perceived as altruistically significant (Aliagha, Maizon, Afeez, and Ali, 2013). For example, Roa et al. (2012) find that the quest for thermal comfort and a quality acoustic environment influence people to demand green commercial property. Their assertion is based on investigation that most conventional properties by their nature are often associated with low worker productivity and a poor acoustic environment, which leaves tenants and users irritable and distracted (Miller, Pogue, Saville, and Tu, 2009).

Aliagha and Yin (2013) observed that personal and general altruistic motives are the key factors for energy conservation behavior. Personal norms that lead to pro-environmental action are activated by the belief that the environmental situation may threaten things an individual values and that this person can act to reduce the threat. Linking this to our study, we posit that in order to maintain thermal

comfort in a real estate organization while wearing business suits and neckties, the prevalent attitude and habit of most workers has been to set office air conditioning systems to a temperature as low as 20°C. However, with growing environmental awareness and consciousness, office workers are developing pro-environmental beliefs that may be attributed to altruistic or personal moral norms and values. For example, some office workers may be participating in energy conservation measures not only because it saves energy and money, but because of their altruistic belief that climate change and its effects on humans and the environment are real and they can act to reduce these effects (Aliagha and Yin, 2013). Even when some may not believe or understand climate change, they may still feel morally obliged to engage in energy conservation because their friends and colleagues expect them to do so, or their boss expects them to comply because it is part of the organization's social responsibility and green work style to conserve energy and reduce their carbon footprint.

Corporate Conscience and Responsibility Motivations

Subjective evidence suggests that green building investment is considered a social process of meeting corporate responsibility. Tenants demand for green real estate is due to enhanced reputation benefits and corporate social responsibility (Kok, Miller, and Morris, 2012). According to Kok, Miller, and Morris (2012), such a move in tenant penchants for green building could mean that tenants are using the buildings they occupy to communicate their corporate vision to shareholders and employees. The inference is that social factors could stimulate the motivation and decision to undertake socially desirable actions such as going green. Thus, ethical responsibility of caring for the environment and social pressure to meet the needs of communities and organizations could motivate the demand for green building. For example, in many countries, people want to live in nice and safe homes surrounded by abundant green space and close to transportation and their workplace (Heerwagen, 2000). As reported by Guild Quality (2013), the cognitive motivating decisions to curtail strains on local infrastructures in a community could be regarded as social responsibility. Such motives may be driven by the intention to minimize the damage on structures such as landfills, water sources and drains, reclaim and produce green space, expand transportation routes, and reduce road repairs (Ian, 2010). Linked to this is user satisfaction, reduction in absenteeism, and the ability to attract and retain workers (Isa, Rahman, Sipan, and Hwa, 2013; Nduka and Ogunsanmi, 2015).

Economic and Financial Motivations

Another commonly attractive motivation for green commercial building investment is economic and financial benefits. The intention of a potential green commercial property investor is to get a reasonable rate of returns from an investment. This benefit may not necessarily be in the form of cash but other soft-cost benefits. However, the initial cost of investing in green commercial property may be higher than for a typical property. This is because various variables such as the cost of building and building certification may come into play. However, the initial costs are easily recouped within the lifecycle of the building (Nurick et al., 2015).

Advocates of this have justified their assertion on the operating cost reduction of green buildings related to water and energy consumption, as well as the improved performance of building tenants (Miller and Pogue, 2009; Kok, 2012; Nurick et al., 2015). Thus, the advantages of green buildings are not only the cost benefits resulting from energy savings but also the possible residual value of the property (Popescu, Bienert, Schutzenhofer, and Boazu, 2012).

Experts say that green building goes beyond optimizing the lifecycle economic performance of the building to securing grants and subsidies, improvement in employees productivity and satisfaction, as well as securing higher rents and increase resale value (Miller, Pogue, Saville, and Tu, 2009; Bowyer et al., 2013; Aliagha, Maizon, Afeez, and Ali, 2013; Nurul and Zainul, 2013). Miller and Pogue (2009) analyze the operating costs, energy impact, worker productivity, and tenant attitudes using 154 green buildings and over 700 tenants who moved into primarily ENERGY STAR-labeled buildings. They show that many tenants find such space more productive, and that green buildings do save money on energy costs. Moreover, the literature on green buildings, which mostly focuses on new construction, shows a positive relation between green commercial building and financial returns. For example, Eichholtz, Kok, and Quigley (2010, 2013) largely find positive effects on market rents and selling prices on certified office buildings in the U.S. In addition, Fuerst and McAllister (2009) and Miller, Pogue, Saville, and Tu (2009) suggest that there are positive economic and financial related benefits from quicker absorption, higher occupancy rates, lower operating expenses, higher residual values, and higher worker productivity in green building investment.

Data and Methods

Data and Participants

When trying to identify and select individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest, the key and appropriate sampling procedure often considered is the purposive sampling technique. Our focus of inquiry is to sample those who are knowledgeable and experienced in the subject matter. The participants we selected are knowledgeable about the subject matter. We used stratified sampling to select these participants. Stratified sampling involves a process of stratification segregation of population nests or for investigation into strata or categories. We opted for stratified sampling to ensure adequate and better representation. We deviate from previous studies and base the unit of analysis in our study mainly on the perspective of the real estate development team rather than occupants. Thus, our research participants are real estate developers, investors, architects, estate surveyors and valuers, builders, and town planners who are involved and knowledgeable in green building development and investment. They mainly constitute the real estate development team.

Given the greater concentration of potential research participants, Malaysia's major urban city Kuala Lumpur was chosen as the target for our survey. We

distributed a total of 400 sets of questionnaires among the classes of potential participants. Out of the 400 we distributed, 361 were received, 39 were not returned. Out of the 361 we received, we rejected 11 because of incomplete responses. Moreover, they were not properly complete. We used the remaining 350 for our analysis. In drawing the samples for this study, we referred to Krejcie and Morgan's (1970) decision model. It is a research instrument that provides a generalized scientific guide and table for sample decisions. It is argued that were the samples are broken into sub-samples, a minimum of 30 for each category is necessary and that in multivariate research, the sample size should be larger. Given this modifying factor, the sample size for this study is 350. The sample size is considered appropriate to take into account the different sub-samples and also to meet the statistical requirements of the multivariate techniques we employ.

Questionnaires were administered face-to-face. Several visits were made and reminders sent including phone calls. The study included incentives to motivate people to respond to the questionnaires. However, those who had no time to complete the questionnaires either immediately or after the second and third appointments were given self-addressed stamped envelopes or email addresses to return the questionnaires. The academic background of the 350 respondents is as follows: post-graduate 22.6%, degree 47.7%, and diploma 29.7%. Thus, it is evident that the respondents have either a university or polytechnic education. The response rates show that developers constituted 30.1%, architects 23.6%, estate surveyors and valuers 18.6%, investors 12.3%, builders 12.0%, and town planners 4.0%. On years of professional experience, the respondents had the following: 2–3 years 9.1%, 3–4 years 15.4%, 4–5 years 21.1%, and 5 years and above 54.3%.

Instrument and Measures

The questionnaire was divided into two parts. The first part contained general demographic questions designed to tap into the participants' background information. The second part comprised a set of questions that were intended to shed light not only on the participants' awareness of the green properties but also on factors that could motivate green commercial property demand. In this part of the questionnaire, respondents were asked to specify the levels of importance they attach to the variables using a 5-point Likert scale. Five factors and their measures for validation are shown in Exhibit 1. The items were selected to elicit measurements of the five factors because both the theory and literature support them.

Structural Equation Modeling

When attempting to analyze the inter-relations among multiple variables in a model, the key statistical technique often used is structural equation modeling (SEM). SEM allows a set of relation between one or more independent or dependent variables to be examined (Zainudin, 2012). Our key objective of using SEM is to analyze the pattern of sequence and structure of inter-related dependence relations between a set of latent or unobserved constructs, each measured by one or more observed variables (Shammout, 2007; Zainudin, 2012).

Exhibit 1 | Factors and Their Measures for Validation

Factor	Variables
Factor 1: Personal and altruistic environmental motivation measures (PAEM)	Enhanced energy efficiency and CO ₂ reduction (PAEM1) Improved water efficiency (PAEM2) Thermal comfort and quality acoustic environment (PAEM3) Reduction of solid waste and minimize site impact (PAEM4)
Factor 2: Corporate conscience responsibility motivation measures (CCRM)	Users' satisfaction and more control over the environment (CCRM1) Minimization of strain on local infrastructure (CCRM2) Reduction in absenteeism (CCRM3) Boosts creativity, higher morale, and lower workforce turnover (CCRM4)
Factor 3: Economic cum financial motivation measures (EFM)	Optimization of life cycle economic performance (EFM1) Securing grants and subsidies (EFM2) Improvement in employees' productivity and satisfaction (EFM3) Securing higher rents and increased resale value (EFM4)
Factor 4: Available green skills (AGS)	Design skills (AGS1) Construction skills (AGS2) Maintenance skills (AGS3) Procurement skills (AGS4)
Factor 5: Monetary green tax incentives (MGTI)	Tax abatement and fee waiver (MGTI1) Grants, loans and rebates (MGTI2) Property tax credit incentives (MGTI3) Low capital gains tax (MGTI4) Low stamp duties (MGTI5)
<i>Notes:</i> Factor 4 (AGS) and 5 (MGTI) were used to determine or predict level of causal effect on personal and altruistic environmental motivation PAEM; corporate conscience responsibility motivation CCRM and economic and financial motivation EFM aggregated as F1. AGS and MGTI are aggregated as F2 and F3 respectively in the structural model (see Exhibit 5).	

Basically, we used SEM to build a concept of causal relations where a modification in one variable, hypothetically effects a change in an alternative variable. Furthermore, we adopted SEM to measure and evaluate the validity and reliability of each construct and to check the overall goodness-of-fit of the model. We did this to ensure that the model fits the data adequately. In conducting the SEM, we used a measurement model to test the convergent and discriminant validity, as well as construct and determine the item reliability of the constructs. We used the SEM to predict the causal relations of the factors, in addition to testing of the hypothesis.

However, it is important to note that there are series of fit indices that are essential when reporting the fitness of a model. Although there is no agreement yet among

Exhibit 2 | Convergent Validity for Demand Factors of Green Commercial Property Investment

	PAEM	CCRM	EFM
	F1	F2	F3
PAEM 1 (EECR)	0.622	—	—
PAEM 2 (IWE)	0.687	—	—
PAEM 3 (TCQAE)	0.560	—	—
PAEM4 (RSWAS)	0.591	—	—
CCRM 1 (USMCOE)	—	0.558	—
CCRM 2 (MSLI)	—	0.668	—
CCRM 3 (RIA)	—	0.683	—
CCRM 4 (BCHMLWT)	—	0.543	—
EFM 1 (OLEP)	—	—	0.556
EFM 2 (SGS)	—	—	0.535
EFM 3 (IEPS)	—	—	0.829
EFM 4 (SRIRV)	—	—	0.759

scholars as to which fit indices should be reported. Thus, we adopted the most generally used fit indices to assess the models. This we believe provides a detailed reflection of goodness-of-fit as suggested by Hair et al. (1995). The measures include the following: chi square (X^2) in AMOS, goodness-of-fit index (GFI), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), adjusted goodness-of-fit index (AGFI), and normed fit index (NFI). Various levels of acceptable thresholds have been suggested by different authors. For GFI, Hair et al. (1995) suggest an acceptance level of 0.90 as appropriate. For CFI, Chau and Hu (2001) view a threshold of ≥ 0.8 as acceptable whereas Schreiber et al. (2006) suggest 0.09 or greater. For RMSEA, Hair et al. (1995) recommend a commonly acceptable value ranging from 0.05 to 0.08. Comparable to GFI, Hair et al. (1995) also suggest a level of 0.90 as acceptable for AGFI, while a generally suggested threshold of 0.90 or greater is acceptable for NFI (Hair et al., 1995; Byrne, 2010).

Results

Measurement Model

As shown in Exhibit 1, we identified the items that measured the constructs and factors affecting the demand for green commercial properties. The representative variables in Exhibit 1 represent each construct. We measured and validated them. We tested them for convergent and discriminant validity, as well as construct and item reliability (see Exhibits 2, 3, and 4). We found that some methods have been recommended for assessing convergent and discriminant validity. They include

Exhibit 3 | Average Variance Extracted Test for Discriminant Validity

Pairs of Factors	Aver. Variance Extracted	Squared Correlations (ϕ^2)
F3 EFM	0.65	0.45 (0.202)
F2 (CCRM)	0.61	
F3 EFM	0.65	0.64 (0.409)
F1 (PAEM)	0.66	
F2 CCRM	0.61	0.60 (0.360)
F1 (PAEM)	0.66	

Exhibit 4 | Test of Construct Reliability

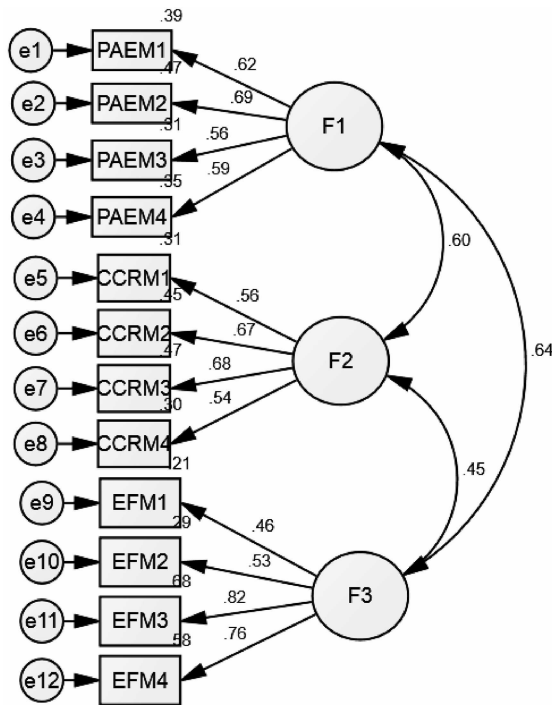
Constructs	Cronbach's Alpha	Aver. Variance
F1 PAEM	0.602	0.66
F2 CCRM	0.547	0.61
F3 EFM	0.637	0.65

factor analysis, correlation, and even more advanced techniques including confirmatory factor analysis (CFA) existing in SEM. In addition, we used AVE as an indicator for supporting convergent validity (Shammout, 2007).

Convergent Validity. We achieved the convergent validity of the model when we found that all items in the measurement model were statistically significant. We found that all the variables measuring the same factor or constructs were significant. This evidence supports the convergent validity of the variables (Anderson and Gerbing, 1988). We conducted the convergent validity (CV) using 12 items that measured four different factors and constructs. Constructs F1, F2, and F3 are measured using 4 items respectively. This is structurally shown in Exhibit 5. All the items loaded on their respective factors with most loadings above 0.08 (see Exhibit 2). Also, the statistical significance of each path correlation coefficient for all the exogenous or independent factors (F1, F2, and F3) show that the factors are significantly correlated. To demonstrate convergent validity, the scale of the direct structural relation between the item and the latent construct (or factor) is measurably different from zero. In addition, the items loaded highly on one factor with a factor loading of 0.50 or greater (Holmes-Smith, Coote, and Cunningham, 2006; Shammout, 2007).

Discriminant Validity. We also check the discriminant validity of the model. The discriminant analysis was done to confirm if the values of the correlation coefficient between pairs of constructs are significantly different from unity or perfect correlation (Sekaran, 2000; Shammout, 2007). To test the discriminant validity, we paired each of the constructs and simultaneously analyzed them and extracted the average variance. For example, to test the discriminant validity of

Exhibit 5 | Path Diagram for Validity Measurement of Demand Factors Affecting Green Commercial Property Investment



constructs “F3 (EFM) and F2 (CCRM),” we paired and compared them and their average variances were extracted. If the pattern structure of the coefficients to determine whether measured factors are distinguishable, it indicates the discriminant validity of the two constructs (Sekaran, 2000; Shammout, 2007). Thus, as summarized in Exhibit 3, the average variances we extracted for the four factors are all larger than the squared pairwise correlated for the three factors. We therefore conclude that the three constructs or factors exhibited discriminant validity.

Construct and Item Reliability. To determine the degree of reliability of the measurement model in measuring the intended latent construct (Zikmund, 2003), we checked the internal consistency of the item reliability. We used Cronbach’s alpha estimates for the verification of the constructs and item reliability, supported by measurement model estimates (Shammout, 2007). To achieve this, we subjected the constructs of personal and altruistic environmental motivations, corporate responsibility motivations, and economic and financial motivations to construct assessment. In measuring the reliability, we found that a recommended threshold of between 0.50 and 0.60 is acceptable (Hair et al., 2006; Shammout, 2007). As summarized in Exhibit 4, the statistics indicate that the three constructs (PAEM, CCRM, and EFM) show evidence of internal consistency and, therefore, satisfy

Exhibit 6 | Goodness-of-Fit Statistics for Validity Measurement of Demand Factors of Green Commercial Property Investment

Chi square	DF	GFI	AGFI	NFI	CFI	RMSEA	CMIN	p-Value
269.894	351	0.910	0.962	0.938	0.964	0.692	3.214	0.000

the construct and item reliability criteria. The Cronbach's alpha coefficient ranges from 0.547 to 0.637, while the average extracted variance varies from 0.61 to 0.66. In all, more than 50% of the variance of the constructs is explained. Moreover, the goodness-of-fit indices as shown in Exhibit 6 demonstrate construct validity. Furthermore, the three constructs exceeded the suggested threshold of 0.50 of the variance extracted. Thus, the reliability and variance estimates indicate that all the specified indicators are adequate in their measurement of the constructs.

In our opinion and as supported by various authorities the fit statistics for the model, validation as shown in Exhibit 6 indicates a reasonable goodness-of-fit model. The results showed that the model is validated and achieved all the required fit indices within the acceptable thresholds. The chi square is significant ($X^2 = 269.894$, $df = 351$, $GFI = 0.910$, $AGFI = 0.962$, $NFI = 0.938$, $CFI = 0.964$, $RMSEA = 0.692$, $CMIN = X^2/df = 3.214$, and $p\text{-value} = .000$ (Chau and Hu, 2001; Hair et al., 2006; Schreiber et al., 2006).

Structural Aspect of the Model

We use the SEM to determine or predict the level of causal effect of available green skills (AGS–F2) and monetary green tax incentives (MGTI–F3) on personal and altruistic environmental motivation (PAEM), corporate conscience responsibility motivation (CCRM), and economic and financial motivation (EFM). We aggregated the following factors (PAEM, CCRM, and EFM) as F1. Hypothesis 1: F1 (PAEM, CCRM, and EFM) is significantly dependent on F2 (AGS). Hypothesis 2: F1 (PAEM, CCRM, and EFM) is significantly dependent on F3 (MGTI). To further reduce complexity, we also aggregated the variables measuring a particular factor into one factor. For example, the four variables measuring personal altruistic environmental motivations—enhanced energy efficiency and CO₂ reduction, improved water efficiency, thermal comfort and quality acoustic environment, and reduction of solid waste and minimize site impact—were aggregated to PAEM. In the same way, we aggregated the four variables determining corporate conscience responsibility motivations—user satisfaction and more control over the environment, minimization of strain on local infrastructure, reduction in absenteeism and escalation of creativity, and higher morale and lower workforce turnover—to CCRM and so on. It was convenient for us to perform the aggregation because all the aggregated variables had been validated in terms of validity and reliability. However, a few items of available green skills (AGS–F2) loaded insignificantly or have higher modification indices

Exhibit 7 | Structural Model of Demand Factors Affecting Green Commercial Property Investment

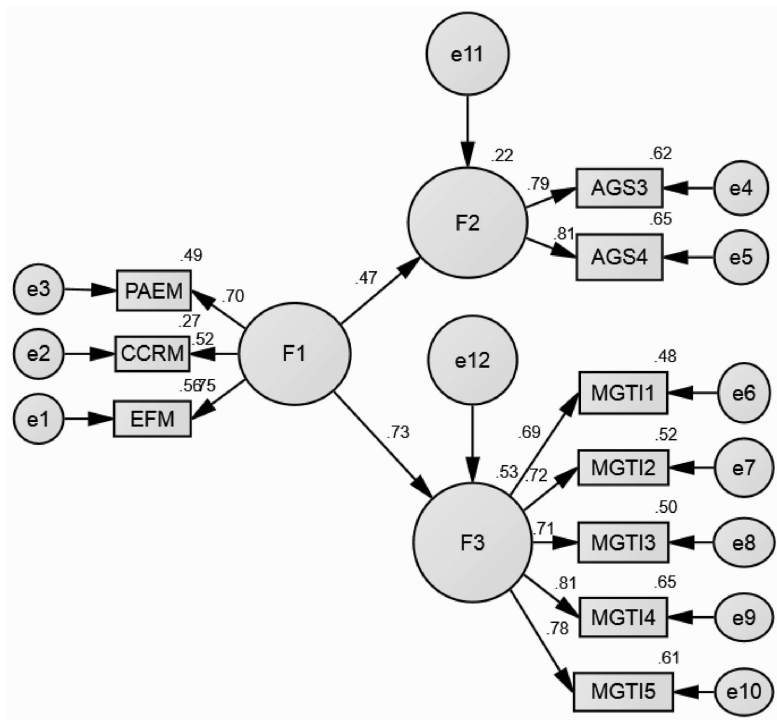


Exhibit 8 | Structural Equation Modeling (Testing Hypotheses Using Standardized Estimates)

Hypothesized Path	Standardized Estimates	Std. Error	CR (Z-Value)	Supported
H1: F1 ← F2	0.47	0.030	6.733***	Yes
H2: F1 ← F3	0.73	0.024	6.535***	Yes

(MI) (AGS1 and AGS2), so we deleted them. This is in response to a more parsimonious fit of the model, as suggested by (Zainudin, 2012). The path diagram in Exhibit 7 illustrates this scenario.

Exhibit 8 displays the results of the hypothesis testing of the structural model. The estimates of standardized coefficient revealed significant influences between F2 and F3 (available green skills and monetary green tax incentives) on F1 (personal altruistic environmental motivations, corporate conscience responsibility motivations, and economic and financial motivations (F2: $\beta = 0.47$; $z = 6.733$, $p > 0.05$; F3: $\beta = 0.73$; $z = 6.535$, $p > 0.05$) respectively. The results indicate that the demand factors of green building such as personal and altruistic

Exhibit 9 | Goodness-of-Fit Statistics for Model of Demand Factors of Green Commercial Property Investment

Chi square	DF	GFI	AGFI	NFI	CFI	RMSEA	CMIN	p-Value
162.348	334	0.937	0.995	0.988	0.833	0.689	2.348	0.000

environmental motivations, corporate conscience responsibility motivations, and economic and financial motivations are significantly influenced by available green skills and monetary green tax incentives. As such, they have a direct positive effect on investors' decisions to demand and invest in green building, thus constituting the major motivating factors for green commercial building investment (Hair et al., 2006).

However, for a hypothesis to be considered fit to the data, we examined the goodness-of-fit indices. We did this in order to assess and evaluate the structural model. Therefore, in the underlying structural equation modeling assumptions, we examined the coefficient parameter estimates, along with overall model fit indices to test Hypotheses 1 and 2. Exhibit 9 shows that the model demonstrated significant goodness-of-fit values that show that the model fits the data adequately. Thus, our model achieved all the required fit indices within the acceptable thresholds.

Discussion

In this study, we tested the casual effects of monetary green tax incentives and green skills in explaining the decision of investors to invest in green commercial building. Specifically, the objectives of the study was achieved as each motivating construct or factor that is particularly linked to green commercial building investment and demand were identified through the SCT theory and literature review. The predictive constructs were validated as motivating factors for green commercial building demand and investment. In the validated model, the three constructs and factors (F1, F2, and F3) were found to be significantly correlated and were within the acceptable threshold. Overall, the result of the validation confirmed the constructs as factors that influence investors' decisions to invest in green commercial building. The validated constructs were further modeled to determine the casual effects of green skills and monetary green tax incentives on them.

An examination of the estimated standardized coefficients and z-values showed the effect and influence of F2 and F3 (AGS and MGTI) on F1 (PAEM, CCRM, EFM). Specifically, the findings revealed that monetary green tax incentives (MGTI–F3) had a greater influence on factors affecting green commercial building investment. This implies that incentivizing investors through tax credits, loans or grants and subsidies, tax abatement, property tax credits, low capital gains, and/or low stamp duties could woo them to invest in green building. Furthermore,

to improve green building demand and investment, as well as to minimize environmental impact, it is imperative for the government to pay more attention to making green incentives available and attractive to investors. As our results have revealed, attractive incentives would have stronger and positive influences on investors' decisions to invest in green building. Incentives that create neutral policy that neither increases property taxes nor decreases government property tax revenue are ideal. Through this, investors and homeowners' may not be discouraged from installing renewable energy systems such as solar (thermal and photovoltaic), wind turbines, and central wood-fired heating systems, etc. Thus, the findings of this study contribute to the paradigm shift that supports incentivizing green building materials and appliances by making it less costly to boost green building demand and investment. This is consistent with Numraktrakul, Ngarmyarn, and Panichpathom's (2011) view that tax incentives influence individual green building purchase.

Also, the verification of the structural equation modeling supports the conclusion that the application of green skills such as design skills, construction skills, maintenance skills, and procurement skills are major factors that could improve green building investment. Perhaps, this explains why the construct (AGS-F2) exhibited a significant influence among the factors affecting green building investment and as such had strong linear and positive causal relations with green building investment. An important characteristic of green skills in green building investment is its ability to close any existing gap and reduce any current and future extra budgeted cost of maintenance. Thus, investors are now appropriating and considering the expertise and proficiency that ensures construction best practices, which would create a rational ground of expectations and benefits for green building.

For example, as the demand for energy-efficient building is gradually becoming important, developers' and investors' understanding of the heating, ventilation, and air conditioning systems, solar thermal and photovoltaic technologies, and the energy efficiency characteristics of materials before investment is essential. This is because as buildings continue to be part of energy-related carbon emissions, buyers are likely to demand high-performance buildings with new construction techniques that will tackle climate change and reduce emissions. Thus, green skills are important factors in green commercial building investment because of the likely multiple effects they may create. For instance, green technology could increase the rental yield of the building while enhancing the economic values of the building. A well-designed and constructed green office space is likely to command a higher price compared to the typical office space (Hand et al., 2013). This is also consistent with Numraktrakul, Ngarmyarn, and Panichpathom (2011) contention that with enough skills and knowledge of green building, consumers and buyers may be convinced that the purchase decision for green property is not difficult.

Conclusion

The objectives of this study were to identify, analyze, and validate the motivating demand factors of green commercial property investment with the aim of

formulating a structural model that can adequately determine the causal effects of monetary green tax incentives and available green skills and knowledge. The findings showed that monetary green tax incentives and available green skills constitute major motivating factors for green commercial property investment. This has some notable implications. It shows that incentives and skills remain a means of sustaining green building investment and demand. Incentivizing investors with effective tax policies and other economic incentives is possible and increasingly likely if governments want to accelerate green building. Furthermore, investigations have shown that adequate construction and demand of green building cannot be easily achieved without tax incentives. As noted earlier, financial incentives such as tax abatements, grants, loans and rebates, fee waivers or reductions, low stamp duties, and low capital gains taxes are efficient ways of reducing the cost of green building construction and improving its demand. This could explain why there was a strong causal relation between monetary green tax incentives and the factors of green building demand.

However, investors and other stakeholders in green building investment in developing countries are still confronted with poor incentives that are not particularly attractive. Indeed, in some cases, tax incentives are non-existent, and governments are reluctant to introduce them. For instance, in developing countries such as Malaysia, green incentives and policies are still beset with notable criticisms. This could be because incentives for getting GBI certification are not strongly market driven and adequately enticing to attract investors, especially in the areas of qualifying persons, qualifying costs, standardization of GBI income incentives, stamp duty exclusion, and absence of clarity. There are cases where green taxes are more pro-supply with little or no process for sensitizing the demand side to enable both investors and suppliers to have a balanced perception of green building investment. This is lopsided because demand complements supply. In addition, there are poor incentives on more efficient and innovative means and the expertise to design and construct green building that can attract and retain high value tenants, reduce environmental footprints, energy use, and operational costs, enhance employee productivity, and promote collaborative and innovative workplaces. Furthermore, what worries investors and developers is what flux of critical factors would best deliver a high-performance green building that can attract buyers and tenants while at the same time maximize core profit values, which this study has identified. As such it is imperative that the government at various levels should review and improve on their green building incentives and policies to encourage investors and further boost green building demand and investment.

Government policies influence green building investment and demand. Government policies, rules, laws, and regulations are instruments used to maintain standards, ensure quality, and regulate market forces. For example, if the minimum standards and requirements such as green certification and rating process are not met or are too rigid and coercive, it could slow green building development and influence the demand pattern. However, favorable policies and regulations could motivate investors to invest in green building. For example, green certifications,

awards, and recognitions in green building could be a significant means of encouraging investors to go green. For instance, green awards like “green flag” could be awarded to individuals or investors who distinguish themselves in green building practices by government or rating bodies like LEED, BREEAM, Green Mark, Green Building Index (GBI), and Green Star. Such actions would increase the interest in the green building investment market. Our study contributes to the literature on the theory of social cognitive theory (SCT) and other related theories. However, the factors and variables used in the model lean greatly on the SCT.

References

- Alev, P.D. and A. Baabak. An Overview of the Benefits and Risk Factors of Going Green in Existing Buildings. *International Journal of Facility Management*, 2010, 1:1, 1–15.
- Aliagha, U.G., H. Maizon, S.O. Afeez, and K.N. Ali. Review of Green Building Demand Factors for Malaysia. *Journal of Energy Technologies and Policy*, 2013, 3:11, 471–78.
- Aliagha, U.G. and N.C. Yin. Perceptions of Malaysia Office Workers on Adoption of Japanese Cool Biz Concept of Energy Conservation. *Journal of Asian and African Studies*, 2013, 48:4, 427–46.
- Anderson, J.C. and D.W. Gerbing. Structural Equation Modelling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 1988, 103:3, 411–23.
- Batson, D.C. Empathy-induced Altruistic Motivation. Draft of lecture and chapter for Inaugural Herzliya Symposium on Pro-social Motives, Emotions and Behavior. Department of Psychology, University of Kansas, 2008.
- Bowyer, J., K. Fernholz, S. Bratkovich, J. Howe, S. Stai, and M. Frank. Life Cycle Cost Analysis of Non-Residential Buildings. Dovetail Partners Inc., 2013.
- Byrne, B.M. *Structural equation Modelling with AMOS: Basic Concepts Applications, and Programming*. New York, NY. Routledge, 2010.
- Chau, P.Y.K. and P.J.H. Hu. Information Technology Acceptance by Individual Professionals: A Model Comparison Approach. *Decision Science*, 2001, 32:4, 699–719.
- Chegut, A., P. Eichholtz, and N. Kok. Supply, Demand and the Value of Green Buildings. *Urban Studies*, 2014, 50:1, 22–43.
- Christopher, W.S. Adoption of Residential Green Building Practices: Understanding the Role of Familiarity. Ph.D. Dissertation. University of Michigan, 2007.
- Eichholtz, P.M.A., N. Kok, and M. Quigley. Doing Well by Doing Good: Green Office Building. *American Economic Review*, 2010, 100:5, 2494–511.
- . The Economics of Green Building. *The Review of Economics and Statistics*, 2013, 95:1, 50–63.
- Fuerst, F. and P. McAllister. An Investigation of the Effect of Eco-Labeling on Office Occupancy Rates. *Journal of Sustainable Real Estate*, 2009, 1:1, 49–64.
- Governor’s Green Government Council (GGGC). Building Green in Pennsylvania. What is a Green Building? Fundamental Principles of Green Building and Sustainable Site Design. Pennsylvania: Governor’s Green Government Council. 2010.
- Guild Quality. Homeowner’s Perspective: The Value of a Green Home. <http://www.guildquality.com/corp/wp-content/uploads/2014/01/GuildQuality-Green-Home-Study-White-Paper-1-30.pdf>. Accessed December 26, 2013.

- Hair, J.F., R.E. Anderson, R.L. Tatham, and W.C. Black. *Multivariate Data Analysis with Readings*. Englewood Cliffs, NJ: Prentice Hall. 1995.
- Hair, J., W. Black, B. Babin, R. Anderson, and R. Tatham. *Multivariate Data Analysis*. Upper Saddle River, NJ: Prentice-Hall, 2006.
- Hand, A., J. Zuo, R. Rameezdeen, and B. Xia. Green Skills for the Construction Industry. In: *38th Australasian Universities Building Education Conference*, V. Gonzalez and Y.T. Wing (eds.). The University of Auckland, 1–10, 2013.
- Heerwagen, J. Green Buildings and Worker Well Being. *Environmental Design and Construction*, 2000, 24–9.
- Holmes-Smith, P., L. Coote, and E. Cunningham. *Structural Equation Modelling: From the Fundamentals to Advanced Topics*. Melbourne: SREAMS, 2006.
- Ian, M.C. *Green Infrastructure: Concept, Perceptions and its Use in Spatial Planning*. PhD. Dissertation, Newcastle University, 2010.
- Isa, M., A.M.G. Rahman, I. Sipan, and K.T. Hwa. Factors Affecting Green Office Building Investment in Malaysia. Paper presented at the Asia Pacific International Conference on Environment-Behaviour Studies, University of Westminster London, UK, September 4–6, 2013.
- Kok, N. How Green is Overtaking the Commercial Property Market. U.S. Green Building Council. June 25, 2014.
- Kok, N., N.G. Miller, and P. Morris. *The Economics of Green Retrofits*. *Journal of Sustainable Research*, 2012, 4:1, 4–22.
- Krejcie, C. and L. Morgan. Determining Sample Size. In: *Research Methods for Business: A Skill Building Approach*, U. Sekaran. Seventh edition. Toronto: John Wiley and Sons, Inc., 1970.
- Kriss, J. What is Green Building? U.S. Green Building Council. August 6, 2014.
- Kroll, C.A. Green Buildings in Green Cities: Integrating Energy Efficiency into the Real Estate Industry. MS.c dissertation. Haas School of Business, University of California Berkeley, 2011.
- Miller, N.G. and D. Pogue. Do Green Buildings make Dollars and Sense? USD-BMC working paper 09-11, 2009. <https://www.gbca.org.au/uploads/DoGreenBuildingsMakeDollarsandSensedraftNov102009.pdf>. Accessed February 22, 2017.
- Miller, N.G., D. Pogue, Q.D. Gough, and S.M. Davis. Green Buildings and Productivity. *Journal of Sustainable Real Estate*, 2009, 1:1, 1–31.
- Miller, N.G., D. Pogue, J. Saville, and C. Tu. The Operation and Management of Green Building in the United States. <http://www.normmiller.net/wp-content/uploads/2012/07/Operations-Management-of-Green-Buildings-Tu-et-al.pdf>, 2010. Accessed February 22, 2017.
- Mohd, W.M.S., S. Milad, and G. Nariman. Strategic Approach to Green Home Development in Malaysia—the Perspective of Potential Green Home Buyers. *Life Science Journal*, 2013, 10:1, 3213–24.
- Nazirah, Z.A. Investigating the Awareness and Application of Sustainable Construction Concept by Malaysian Developers. *Habitat International* 2010, 34, 421–26.
- Nduka, D.O. and O.E. Ogunsamni. Stakeholders Perception of Factors Determining the Adoptability of Green Building Practices in Construction Projects in Nigeria. *Journal of Environment and Earth Science*, 2015, 5:2.

- Nelms, C., D.A. Russell, and J.B. Lence. Assessing the Performance of Sustainable Technologies for Building Projects. *Canadian Journal of Civil Engineering*, 2005, 32:1, 114–128.
- Ng, B-H. and A.A. Zainal. The Development of a Newly Designed Building Performance Survey Framework for Energy-efficient Building: A Review. *Journal of Application or Innovation in Engineering and Management*, 2013, 2:2, 117–25.
- Numraktrakul, P., A. Ngarmyarn, and S. Panichpathom. Factors Affecting Green Housing Purchase. <https://www.wbiconpro.com/508-Atcharawan.pdf>. 2011.
- Nurick, S., K. Le Jeune, E. Dawber, R. Flowers, and J. Wilkinson. Incorporating Green Building Features and Initiatives into Commercial Property Valuation. *Journal of Sustainable Real Estate*, 2015, 7:1, 21–40.
- Nurul, A.D. and N.A. Zainul. Motivation and Expectation of Developers on Green Construction: A Conceptual View. *World Academy of Science, Engineering and Technology*, 2013, 76, 4–27.
- O'Mara, M. Why Invest in High-performance Green Buildings? Schneider Electric white paper. <http://www2.schneider-electric.com/documents/support/white-papers/buildings/Why-Invest-in-High-Performance-Green-Buildings.pdf>. 2012. Accessed February 22, 2017.
- Popescu, D., S. Bienert, C. Schutzenhofer, and R. Boazu. Impact of Energy Efficiency Measures on the Economic Value of Buildings. *Applied Energy*, 2012, 89:1, 454–63.
- Reed, R., A. Bilos, S. Wilkinson, and K.W. Schult. International Comparison of Sustainable Rating Tools. *Journal of Sustainable Real Estate*, 2009, 1:1, 1–22.
- Roa, S.P., R.A. Asrul-Mahjuddin, T. Hong-Wan, A.J. Nurul-Amira, C.D. Nazli-Bin, and M.K.D. Nil Inangda. Thermal and Acoustic Environmental Requirement for Green Buildings in Malaysia. *Journal of Design and Environment*, 2012, 11, 1–9.
- Schreiber, J., A. Nora, F. Stage, E. Barlow, and J. King. Reporting Structural Equation Modelling and Confirmatory Factor Analysis Results: A Review. *The Journal of Educational Research*, 2006, 99:6, 323–37.
- Sekaran, U. *Research Methods for Business: A Skill-Building Approach*. Third edition. New York: John Wiley and Sons, Inc., 2000.
- Shahamir, S.R. and R. Zakara. Green Assessment Criteria for Public Hospital Building Development in Malaysia. Proceedings of 4th International Conference on Sustainable Future for Human Security, 2013. *Procedia Environmental Sciences* 2014, 20, 106–15.
- Shammout, A.B. Evaluating an Extended Relationship Marketing Model for Arab Guests of Five-Star Hotels. Ph.D. dissertation. Victoria University, 2007.
- Singh, A., M. Syal, S.C. Grady, and S. Korkmaz. Effects of Green Buildings on Employee Health and Productivity. *American Journal of Public Health*, 2010, 100:9, 1665–68.
- Wade, J., J. Petty, and L. Ramsay. Energy Efficiency in Offices—Assessing the Situation. The Association for the Conservation of Energy. <http://www.ukace.org/wp-content/uploads/2012/11/ACE-Research-2003-05-Energy-Efficiency-in-offices-Assessing-the-situation-report1.pdf>. 2003. Accessed December 2015.
- Yudelson, J. Predicting the Growth of Green Buildings Using “Diffusion of Innovation” Theory. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.549.7142&rep=rep1&type=pdf>. 2016. Accessed February 22, 2017.
- Zainudin, A. A Handbook on Structural Equation Modeling. Universiti Teknologi Mara, Kelantan: Center of Graduate Studies, 2012.

Zikmund, W.G. *Exploring Marketing Research*. Cincinnati, OH: Thomson/South-Western, 2003.

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