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SUSTAINABLE REAL ESTATE DEVELOPMENT AND ITS IMPLICATIONS ON INVESTMENT: STATISTICAL RELATIONS ON THE CASE FROM AUSTRIA

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Abstract. The building and real estate industry have a significant influence on the environment, economy and the society. A number of benefits are associated with the development of sustainable or green buildings. Sustainable building or real estate construction enables an ethical, viable and practical response to resource consumption and environmental impact. It creates an economic sense on a life cycle costing basis. The current research paper aims to examine the impact of sustainable real estate development (SRED) on investment in green buildings, in the real estate sector. It is pertinent to examine that how embracing sustainability in real estate building impacts or changes value proposition for an investment i.e. how participants in the market filter and scrutinize relevant sets of information and integrate it into an existing framework of investment. For this purpose, the study adopted a quantitative approach, and applied a questionnaire survey strategy. Primary data was collected by distributing survey questionnaire among the real estate investors, in the region of Austria, Vienna, Lower Austria. The information, collected from survey was analysed by the help of statistical techniques, specifically regression analysis, factor analysis, descriptive statistics, as well as reliability test. It evaluated four benefits associated with SRED, which include higher building value (HBV), productivity gains (PG), cost savings (CS), and environmental gains (EG). Using data of 103 Austrian investors, the study finds a significant positive impact of HBV, PG, and EG on dependent variable of Investment in green buildings (IN) at 10% significance level. However, it is unable to find significant association between CS and IN. The study suggests that there is a need to enhance awareness about, and focus on the benefits of sustainable real estate development (SRED) and green buildings.

Keywords: sustainable real estate development, green buildings, sustainable investment, building value, productivity gains, environmental gains, cost savings.

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JEL Classifications: R30, R51, O18, Q56

Introduction

In the recent decades, a significant momentum and strength are observed in the notion of "sustainability construction" with an aim to enable sustainability paradigm to the built environment (Dent, Patrick 2012; Rezk et al. 2015; Dezellus et al. 2015; Traversari et al. 2017; Ahmed et al. 2017; Crosbie et al. 2017; Barberis et al. 2017; Tvaronavičienė 2016; Passerini et al. 2017; García-Fuentes, De Torre 2017; Oates et al. 2017; Daher et al. 2017).

In different parts of the world, especially in the developed states, there is a growing evidence regarding the application of sustainable real estate development (SRED), which creates an ethical and responsible marketing approach for commercial and institutional buildings (Kibert 2016). The building and real estate industry have

a significant influence on the environment, economy and the society. The social, legal and political environment, which are created by state, play an important role (Virglerová *et al*. 2016). In the process of urbanization, real estate plays an important role by providing facilities and buildings with an aim to directly or indirectly satisfy human needs and employment opportunities. Moreover, the significance of construction and real estate industry is associated with its role and size in social and economic development. It also makes a significant contribution towards economic development at the national level (Zhang 2005). A preferred focus on achieving higher business performance does not necessarily mean that the enterprise cannot be oriented to the corporate sustainability concept. This concept requires that enterprises respect and observe the principles of sustainable development (Financial Times Lexicon), which means that the responsibility of a business is much broader than just being linked to the economic aspects of products and services that customers want, hence the profits (Rajnoha, Lesníková 2016). The measurement of sustainability is required due to several reasons (Jurigová, Lencsésová 2015). Corporate sustainability strategy is essential for sustainable development, but also for the successful management of the company through the related social, legal, political and economic requirements in terms of market competition (Schaltegger *et al*. 2012). The key managerial decisions are oriented towards strategic innovations and the knowledge-based economy (Štefko, Gallo, 2015).

Sustainability relates to the awareness of the fragility of resources and ecosystems related to living things and the implementation of economic and technical efficiency. Today, the sustainable and secure development has become an actual and urgent matter in many countries around the world (Korauš *et al*. 2016). In recent years, great emphasis has therefore been placed on generating awareness about sustainability issues (Jurigová, Tučková, Kuncová 2016). Enterprises are responsibly not only for the creation of economic value, but also for wider social relationships. For these reasons has discovered a new tool for measuring performance – Triple Bottom Line (TBL) (Rajnoha *et al*. 2016). In the corporate real estate, the implementation of green or sustainable operations within buildings portfolio is regarded as a fundamental contribution. The reduction of environment impact of an organization is a strategic issue, which not only addresses operations and activities across each constituent part but also extends it to users of goods and services and suppliers (Roper, Beard 2006). It is assumable that a positive perception of companies by their environment could stimulate their financial performance and accelerate the positive influences of these companies on the whole society (Belás *et al.* 2015). It is observed that organizations adopting environmental responsibility in real estate are capable of building more prosperous and secure positions within the global economy (Roper, Beard 2006). In the context of property investment, there are potential impacts of sustainability on investment in real estate. Sustainability, in the real estate investment landscape, impacts various property environments, which include the built environment, pure investment, the external environment, and the regulatory environment (De Francesco, Levy 2008).

This research paper aims to explore the significance sustainable real estate development (SRED) and evaluate its impact on investment in real estate. It is pertinent to examine that how embracing sustainability in real estate building impacts or changes value proposition for an investment i.e. how participants in the market filter and scrutinize relevant sets of information and integrate it into an existing framework of investment. The main players or participants in the investment environment include investors (owners of capital), fund managers (managers of capital), assets owners (De Francesco, Levy 2008). The current research study evaluates the significance of SRED and its impact of investment from the perspective of users of commercial buildings that are investors or owner of capital.

A number of benefits are associated with the development of sustainable or green buildings. Sustainable building or real estate construction enables an ethical, viable and practical response to resource consumption and environmental impact. It creates an economic sense on a life cycle costing basis. Moreover, sustainable designs promote the health of occupants/users through the promotion of dehumidification, avoiding contamination, using ultraviolet radiation in ventilation, etc. (Kibert 2016). The success of SRED and green buildings and enhancement of sustainability is dependent on consumers' patronage and acceptance for sustainable development. It is, therefore, essential to explore the significance or benefits of SRED and its association with investment in the real estate sector from the perspective of investors or users of commercial buildings.

1. Literature Review

1.1. Sustainable Real Estate Development (SRED) and Investment landscape

Since the past decade, much of the research studies in the realm of sustainable development of Real estate sector revolve around integrating disparate quantitative (profitability) aspects with this nascent approach. These quantitative aspects entail a broad range of parameters like saving the cost of utilities (energy, water, and waste, etc.), marketability of green buildings, lucrative tenancy agreements, and assuaged cost of depreciation for buildings (Deloitte 2014). The corporate sustainable concept is based on the globally-oriented concept of sustainable development. In general, the most acceptable definitions are those that come from the report of the World Commission of the United Nations Environment and Development. The environmental indicators being assessed can be organized into 3 major groups of environmental indicators: environmental quality, environmentally responsible behaviour, and consumption of environmental services (Streimikiene 2014). The brisker these parameters integrate with the sustainable real estate development; the more positive and profound implications are expected to be observed in garnering robust investment in this sector.

According to Ellison and Sayce (2007), sustainability of buildings should be taken into consideration for evaluating its risk before acquiring (this risk entails utilities, repairs and maintenance expenses) for the purchaser. However, before this consideration, a tool necessary for the evaluation of buildings on the basis of its sustainability must be developed to analyse rapidly changing customer's behaviours for these types of buildings; because a slight change in the occupier requirement would result in the devastating effect on both investment volume and current market value of the property (Ellison, Sayce 2007). This study not only facilitated in the determination of accessibility criteria for sustainability but, also the worthiness of financial appraisal method through which calculation of sustainability impacts are taken into consideration.

Further studies on the multidimensionality of sustainability revealed many other intriguing aspects too, which entail the impact of sustainability in revamping investment landscape (Pivo, McNamara 2005). These studies firstly articulated the concept of sustainability in the broader context and then linked its impacts in building a robust investment landscape in any particular country.

Pivo and McNamara (2005) tied sustainability with the nascent concept of responsible property investment from multiple aspects. This pithy definition of sustainability entails the two keen facets of the responsible property investing; maximizing investors returns through real estate investment while in doing so minimize the negative impact from a wide array of these investing activities. These activities include predominantly the ownership and management of property while sustaining jurisdiction surroundings and natural environment in numerous ways (Pivo, McNamara 2005). In other words, sustainability is linked with noteworthy fragments of economic and financial prosperity, community development, and the obstruction of environmental degradation. In the same study, a heterodox approach was incorporated by the scholars to analyse sustainability factor as an intangible risk factor (long term durability of buildings, prospective environmental changes, etc.) would affect property value and its attractiveness for tenants and investors associated with the real estate sector. However, the keen dilemma the real estate sector is facing in the wake of this development is in quantifying external costs while pricing property in the real estate market. These external costs savings results from incorporating sustainable practices in this industry, especially in term of assuaged cost of utilities (energy, water, and waste disposal, etc.). The solution to this dilemma is assigning higher market prices to property for making them as a catalyst in driving efforts to determine above mentioned external costs.

In the extension of above 'argument of dilemma' that the real estate sector is facing in quantifying sustainability, returns are well-articulated in other similar studies in a very new fashion (Ekman, Röndell 2016). According to the study conducted by Falkenbach, Lindholm, and Schleich (2009), the implementation of sustainable factors in real estate sector is following a sluggish downward trajectory; due to the higher construction costs (especially the cost of environment friendly materials), the scarcity of concrete empirical evidence linking profitability with these practices, uneven construction cost distribution and the lack of awareness about these

practices in real estate investors. In conjunction with investors' awareness, the demand for wholesome sustainable buildings did not depict increasing trajectory. Instead of this, investors are found to be more inclined towards in demanding particular green features in the buildings rather than the complete sustainable buildings. This study also employed the survey-based technique in order to the determination of willingness to pay for the prospective tenants of sustainable buildings. It has been found that the selected participants of the particular jurisdiction were found to be willing to pay a premium of 2% to 17% premium rent for sustainable spaces (Sayce, Ellison, Parnell 2009).

Amid other critical results that have been computed by researchers; it has been observed that certified buildings (sustainably built) were found to be incurring lower operating costs as compared to uncertified buildings (conventionally built). Till now, despite the presence of outpouring literature on the subject matter, impact of sustainability is not yet quantified with investment yields. However, the vacancy rates are (time passed without any tenancy agreement) found to be lower amid certified sustainable buildings as compared to conventionally built buildings or houses (Falkenbach, Lindholm, Schleich 2009). Despite the upward trajectory of the volume of discussion of sustainable real estate development, till now existing literature somehow failed to address some keen problems. Like many of the studies taken into account the sustainable construction of educational institutions as an example to lower construction cost; whereas usually, real estate investors do not invest in such type of buildings. This is the reason on the basis of these results, these studies mentioned, it is not possibly to infer the same conclusion for orthodox real estate investors having a lack of knowledge about sustainable spaces (Falkenbach, Lindholm, Schleich 2009).

The impact of sustainability and its implications are stretched across four disparate environments of our surroundings. Amid them, our subject of discussion focal point remains to investment environment with the presence of three keen holders; owners of capital (investors), manager of capital (funds manager), and asset owners (land owners). For the prominent success of sustainable practices in real estate sector, the integration between above-mentioned environments and their subsets is inevitable (De Francesco, Levy 2008). In wake of these implications, the pertinent issue that still faces by the stakeholders of real estate sector is the change in the value proposition of property after adopting sustainable practices. In implementation role of the sustainability, the keen role of major players (land owners and investors) should be taken into a great consideration (De Francesco, Levy 2008).

However, despite the critical importance of the impact of sustainability on investment landscape (Ao, Wu, Zhu, Yang 2008), it is also crucial for stakeholders (especially investors) to evaluate and gauge the investment performance by taking into account the considerations of property valuations, risk, and returns, and the cost of capital. In doing this performance assessment, Boyd (2006) proposes a heterodox methodology of triple down approach. This triple down approach can be well-articulated from the table 1 below.

Table 1. Investment landscape

Stakeholders	Impacts	Evaluation Metrics
Property owners (Investors)	- Change in risk and reward parameters. - Valuation of cash flows from the property. - Cost of capital or discount rate.	- The presence of investment indices. - The usage of transactional data or modified DCF approach for externalities.
Funds Managers (Mangers of property)	- Products facets. - Marketing and pricing of property products.	- Comparative analysis of products. - The opportunity cost involved between long and short term profits.
Asset owners (Landlords)	- Portfolio construction. - Decision involved assets allocation.	- Segmentation of market statistics of sustainable property. - Change in investments goals and objectives.

Source: De Francesco, Levy 2008

In the above-mentioned context of sustainability, risk and return evaluating parameters are set to change. Both possibilities are involved with the evaluation of return, in same conditions; it may increase, while in others it may decrease. However, this implication should precipitate the need for an extensive data on the subject matter for the identification and quantification of the effects of sustainability on these parameters (Boyd 2006).

1.2. Sustainability in Real Estate

Till now, many research studies have invested their research findings in defining sustainable real estate development (Choi 2009; Glac 2015; Ellis 2009; Hall 2001). This widespread definition of sustainable development has developed over the time period in response to the brisk changes in the climate and environment. Thus, sustainable development of real estate sector can be described as the construction of sustainable buildings while ensuring the restoration and protection of ecological system, while attaining economic efficiency (Choi 2009). These research studies contributed in a very thorough manner for the protection of the integrity of natural resources. The traditional practices of construction have been the major reasons for the environmental degradation by the real estate sector. According to the findings of the US Department of Energy, commercial buildings energy consumption accounts for the world's 18.7% of energy usage, 40 percent of carbon dioxide gas emissions, and 90% of the potable water consumption (Deloitte 2014). Such austere environmental impacts incurred a great extent of environmental costs to the business over the long run and have substantial effects on the sustainability of any business in the real estate sector.

Numerous studies on the effects of conventional real estate development on the environment also discovered the same devastating results. It has been proposed by Ellis (2009) study that the excessive and rapid construction of real estate sector austerely affects environment conditions. These effects are observed due to the burning of fuel, excessive transportation (especially heavy vehicles movements) (Ellis 2009). To curb this environmental degradation, the concept of sustainable real estate development emerged on the real estate sector canvas (Castro-Lacouture *et al.* 2009). Addae-Dapaah, Hiang, and Sharon (2009) inferred that sustainable development of real estate sector entails the diverse set of strategies to build sustainable places. Predominantly, these strategies revolve around the focal point of indoor air quality (the ample space for the movement of fresh air), efficient and responsible use of construction resources and material, water conservation through effective usage, and retaining indoor air quality for the longer time periods.

However, till now, the prime objective of all these sustainable practices remains focused on the elimination of hazardous impacts of construction activities on the environment (Hall 2011). Many studies on this subject matter; De Giovanni (2012), Edwards and Naboni (2013) also articulated multidimensionality of sustainability impacts on disparate environmental conditions. In the study of De Giovanni (2012), it has been found that the nascent idea of building energy-efficient and sustainable places came into existence in response to the orthodox construction practices in this sector. Another similar study also linked the life span of a building to its sustainability, even if it is no longer in use. According to the study of Edwards and Naboni (2013), any infrastructure should be considered as sustainable infrastructure, if it has the minimal effects on the environment; throughout its entire life cycle (i.e. from construction to its demolition). In spite of the importance of sustainable development in real estate sector, it is also evident from the study that the optimal resource utilization can only be possible through building sustainable infrastructures (Liao, Barooah 2010). In the line of this argument, Glac (2015) supported this notion from his study, which concludes; building a sustainable building is the great mean of employing resources in an efficient and effective way.

The perks associated with the sustainable development of real estate sector are also widely cited in many research studies in the same fashion. These perks not only benefit building owners but, also its users (Choi 2009). The nature of these benefits (tangible and non-tangible) depends upon the nature of sustainable infrastructure. Many stakeholders in the sustainable development of real estate sector also linked these benefits with the efficient and adequate use of land for the purpose of construction (Castro-Lacouture *et al*. 2009). In the study conducted by Edwards and Naboni (2013), it has been found that the sustainable real estate development entails austere considerations to the building layout and the construction materials (environmental friendly materials). Till now, the focus of the efficient use of resources revolves around construction material; however, the efficient usage of water is yet another fragment in this vast agenda of sustainable development of the real estate sector. In a nutshell, it can be inferred from these studies that, predominantly the agenda of sustainable real estate sector development entail efficient usage of resources, construction materials, energy requirements, and leave minimal effects on the environment while doing these.

Despite the lack of knowledge of sustainable buildings in the circle of real estate investors, the demand for sustainable buildings is following an upward trajectory. This soaring demand comes from disparate segments of society; amid them, educational institutions, hospitals, companies, and individuals contributed the huge numbers (Addae-Dapaah, Hiang, Sharon 2009). The keen reasons behind this soaring demand are the benefits associated with the sustainable building, which aids stakeholders (companies, educational institutions, and individuals, etc.) in achieving their objectives efficiently. These benefits entail a broader set of benefits which helps in achieving environmental, social, and economic benefits through the employment of innovative sustainable buildings. In spite of this discussion; the addition of sustainable buildings features into existing conventionally built buildings has their own benefits, which facilitate stakeholders attaining efficient utilization of financial resources (Liao, Barooah 2010).

The discussion of sustainability is not only confined to building sustainable buildings within a single category. Indeed, construction of sustainable buildings can be divided into two distinctive categories; these categories entail active and passive building designs (Hall 2011). The keen facets of passively design sustainable buildings defined by Birkenfeld *et al*. (2011) are the utilization of building site, microenvironment, and other factors to catering the need of cooling, heating, and lightening. This can be elaborated further by the fact that many buildings use sunlight as an alternative to lightening during day time and proper ventilation channels as an alternative to cooling appliances in the building premises. This in turn not only benefits companies to maintain lower operating costs (utilities) but, also facilitate them in improving their employees' well-being and health at workplaces. In contrast to this, actively designed buildings employed sophisticated system and technologies to assuage the repercussions of the consumption of energy by the resident of sustainable buildings. These design and system aid organizations in fulfilling their environmental responsibilities while maintaining their profitability. One such example of these actively built buildings can be found in Google headquarter in USA (Choi 2009). According to the study conducted by De Giovanni (2012), these buildings use solar panels, wind energy, energy efficient office appliances, and photovoltaic technology to innovatively cater their energy requirements sustainably in a self-sufficient manner.

The development of investment and residential demand landscape for sustainable buildings also propels many certifications awarding bodies to certify and rate sustainably built buildings. In the study conducted by Bairds (2010), it has been found that these bodies not only evaluate the design of the sustainable of the buildings but, also gauge their performances over the time period. These certifications and rating mechanisms entail CASBEE (Comprehensive Assessment System for Built Environment Efficiency), BREEAM (British Research Establishment's Environmental Assessment Method), LEED (Leadership in Energy and Environment Design) system, HQE (High Quality Environmental) standard, the Building and Construction Authority of Singapore's Green Mark, and GRIHA (Green Rating for Integrated Habitat Assessment). The worldwide literature overview of sustainable real estate development and its implications for investment landscape we present in Table 2.

Table 2. Overview of sustainable real estate development and its implications for investment landscape

Author	Description
Falkenbach, Lindholm, Schleich (2009)	Implementation of sustainable factors in the development of real estate sector (traditional construction projects) is following sluggish growth due to a variety of reasons; higher construction costs, lack of evidence of its linkage with profitability and investors awareness.
Sayce, Ellison, Parnell (2007)	It has been found that certified buildings (sustainably built) incurred low operating costs due to the minimum usage of utilities (light, energy, heat, and water) and a lower vacancy rate.
De Francesco, Levy (2008)	For achieving responsible development of real estate development, it is inevitable to integrate all keen players of the investment environment (i.e. investors, funds manager, and asset owners).
Choi (2009)	Sustainable construction of buildings is directly linked with its economic and operational efficiency.
Ellis (2009)	Rapid construction of conventionally built infrastructures resulted into the degradation of the environment.
Castro-Lacouture *et al*. (2009)	The concept of sustainable real estate development comes into existence in response to the environmental degradation due to the traditionally built buildings.
Addae-Dapaah, Hiang, Sharon (2009)	The demand for sustainably built buildings comes from educational institutions, hospitals, public authorities and individuals (environment-friendly users).

Liao, Barooah (2010)	Adding features of sustainability in existing conventional buildings has also its benefits; especially it helps in the efficient utilization of financial resources.
Hall (2011)	The construction of sustainable buildings is segregated into two distinctive categories; active and passive design buildings. Both of these categories have their own benefits associated with their design.
Birkenfeld *et al.* (2011)	The facets of passive design buildings are the utilization of its microenvironment, site, and other factors to minimize the cost of utilities (energy, heat, water, etc.)
De Giovanni (2012)	Actively design buildings use disparate technologies and systems to minimize the footprints of energy usage on the environment. These technologies entail; solar panels, wind energy, photovoltaic technology, energy efficient home appliances, etc.
Bairds (2010)	The emergence of sustainable development of real estate sector facilitated the working of environmental certification awarding bodies. Thus, in turn, these certifications ensure the confidence of real estate investors and its users (tenants).

Source: Author's own

2. Research Methodology

The first activity was to consider diverse research approach and identify the most suitable one. Research approach holds undeniable importance in the successful accomplishment of the study. It is due to the fact that research approach helps the researcher in identifying the most appropriate method for the collection and analysis of data (Fowler Jr. 2013). There are mainly three types of research approaches that mainly include: qualitative research approach, quantitative research approach, and mixed research approach. In the context of the present study, we considered both research approaches and found that "quantitative research approach" is the most viable one for this research. It is due to the fact that we had an objective of identifying the benefits of SRED as well as the perception of the real estate sector's investors towards green buildings. Therefore, we had found that it is more optimal to examine all of these aspects in a quantitative manner. It has been established from the study of Creswell (2013) that quantitative research approach helps the researcher in performing study related activities on a particular pattern, i.e., "cause and effect pattern". Cause and effect patterns in any study assists the researcher in addressing the identified problem in a more logical and accurate manner (Rovai, Baker, Ponton 2014). In particular, the selected research approach had remarkably helped the researcher in identifying the relationship amid the variables that had led the researcher in establishing cohesive conclusions regarding green building benefits in the perspective of real estate investors.

It has been documented in the study of Bryman and Bell (2015) that research purpose is another most important feature of any study. Bryman (2015) has suggested that research design greatly contributes in addressing the research problem and accomplishing the research objectives. Research designs are of different types, i.e., meta-analytic research design, review based research design, correlational research design, descriptive research design, semi-experimental research design, experimental research design, etc. (Davies, Hughes 2014; Lampard, Pole 2015). All of these research designs are different from each other and are selected on the basis of research aim and objectives. In this study, we have used descriptive research design and correlational research design. The purpose of selecting and using the correlational research design was to identify and recognize the relationship between the variables that are associated with the perception of the real estate investors regarding green buildings' benefits. On the other hand, the descriptive research design was chosen to profoundly examine the identified variables, in the form of percentages, frequencies, etc.

Apart from the research approach, research purpose, and research design, the selection of appropriate data sources is also important. It is due to the fact that the overall credibility of the study is merely dependent on the availability of the relevant information. Data sources help the researcher in collecting the evidences that are required for answering the research questions and to accomplish the research aim and objectives. According to Matthews and Ross (2014) the credibility of any research is merely based on the data sources that are adopted and used by the researcher. Data sources are mainly of two types that include: primary data sources as well as secondary data sources. (Mertens 2014; Zikmund *et al*. 2013). The current research has used "primary sources of data" to get extensive information about the perception of real estate investors towards green buildings as well as regarding the benefits of green buildings. The main objective of choosing this data source (primary data

source) was to get first-hand and up-to-dated information about the thinking and perception of the investors towards green buildings; thereby, drawing cohesive conclusions. It is significant to bring into the notice that the research instrument that was used to gather primary data was, a "Survey Questionnaire".

Primary data was collected by distributing survey questionnaire among the real estate investors, in the region of Austria, Vienna, Lower Austria. The questionnaire was initially distributed among one hundred and twenty (120) investors; however, after the completion of the survey only one hundred and three (103) questionnaires were found to be usable. The survey questionnaire had included closed ended questions and was based on five point Likert scale, having five (5) different options, from not important to very important.

The information, collected from survey was analyzed by the help of statistical techniques, specifically regression analysis, factor analysis, descriptive statistics, as well as reliability test. While explaining descriptive analysis technique, Davies and Hughes (2014) have suggested that this statistical technique assists the researcher in demonstrating the basic trends as well as patterns that are present in the gathered data. On the contrary, regression analysis fosters the identification of the relationship among the particular variables that are both dependent and independent in nature (Punch, Oancea 2014). However, factor analysis plays an inevitable role in examining the unpredictability among the observed and correlated variables, with respect to the noticed or examined variables (Kline 2014).

3. Research Objectives and Hypotheses

3.1. Research Objectives

As indicated in the introductory part of this research paper, the study aims to evaluate the significance of SRED by assessing the related benefits from the perspective of investors. Moreover, the research investigates the impact of SRED (green building) on investment or willingness to occupy. A number of benefits of green buildings are available for the investors/users, which include productivity, higher value, cost saving, and environmental and healthcare benefits.

On the basis of SRED's significance and its benefits, following are the objectives of the study:
1. To explore the importance of SRED from the perspective of investors
2. To investigate the impact of SRED on investment in the commercial buildings (real estate)

3.2. Research Questions

1. Whether high building value, productivity gains, cost savings and environmental protection are the perceived benefits of SRED, which enhances its significance?
2. What is the impact of the benefits of SRED on investment in green commercial buildings?

3.3. Research Hypotheses

In order to determine the relationship between the SRED's benefits and intention/willingness to invest in commercial buildings, following hypotheses are proposed:
H_1: The impact of higher building value due to SRED is significant on investment in green commercial buildings.
H_2: The impact of productivity gains as achieved through SRED (green building) is significant on investment in green buildings
H_3: The influence of cost saving through SRED is significant on investment in green buildings.
H_4: The influence of environmental gains is significant on investment in green buildings.

4. Research Results

The section of the research paper presents the demographic analysis of the respondents (investors) and explores the significance of sustainable real estate development (SRED) by evaluating its associated benefits. It also presents results of different statistical relationships. According to the results, 65% of the research population are male, while 35% are female. Majority of the respondents in the sample have a graduation degree (35%), followed by diploma (30.1%) as illustrated in the following figure 1.

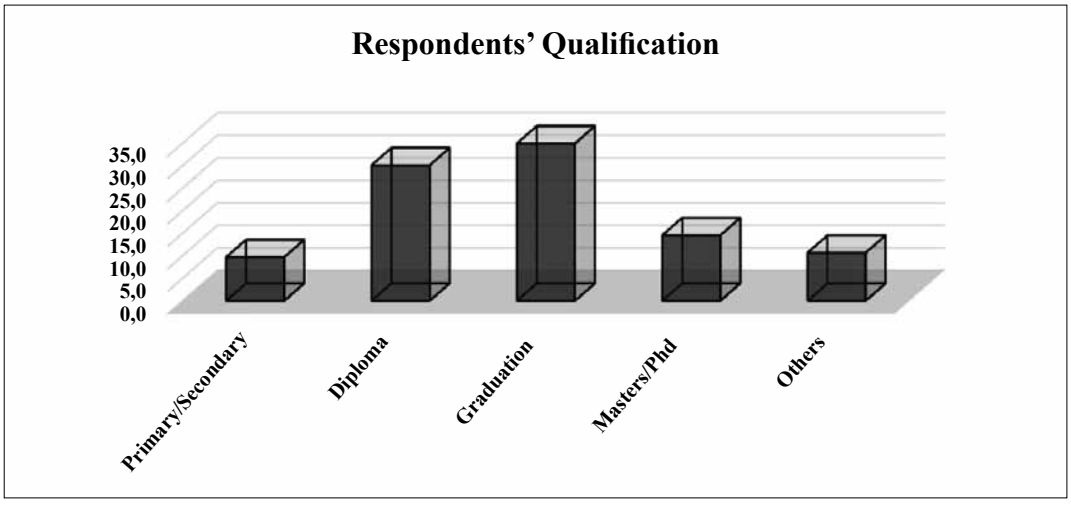


Fig. 1. Qualifications of respondents

Source: Author's own estimation

With respect to respondents' age, majority are within the age group 28-37 years (30.1%), followed by 38-47 years (26.2%), and 48-57% years (22.3%).

In this study, the significance of SRED is assessed by evaluating its associated benefits. The current study considers higher building value (HBV), cost savings (CS), environmental gains (EG) and productivity gains (PG) as the key benefits of green buildings. According to the results, majority of the respondents consider higher rents (74.8%), market distinction (87.4%), faster tenants lease-up (68.9%), and valuation premiums (75.7%) as important factors/benefit as an attribute of SRED in terms of higher building value. In terms of cost saving, majority of the investors find secure grants, low maintenance costs, energy efficiency, and water conservation as significant benefits. Moreover, with respect to productivity gains, the research finds that majority of the investors consider higher morale and user satisfaction as important factors. However, 23.3% and 14.6% consider reduced health and safety risks and reduced absenteeism as 'not so important' benefits of SRED respectively. The respondents also reveal that environmental gains are significant benefits of investing in green buildings, as shown in the figure 2.

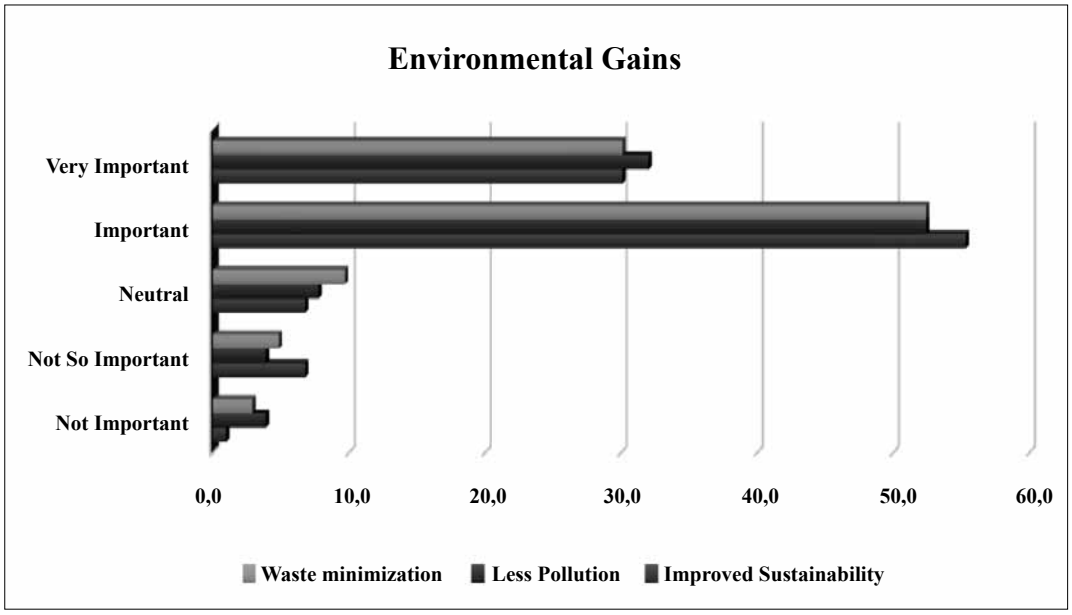


Fig.2. Environmental Gains

Source: Author's own estimation

Reliability (internal consistency) of the 18 test items (HBV = 4; CS = 4; PG = 4; EG = 3; and IN = 3) is also tested using Cronbach's alpha statistic. The test shows high degree of internal consistency for each construct, where alpha values are greater than the minimum acceptable threshold (0.7) – see Table 3.

Table 3. Rotated component matrix

Constructs	Component				
	1	2	3	4	5
Higher Rents (Secure)		.923			
Valuation Premiums		.856			
Market Distinction		.817			
Faster Lease-Up of Tenants		.841			
Efficiency of Energy				.770	
Secure Grants				.863	
Lower Costs of Maintenance				.835	
Reduced safety and health risk	.956				
Reduced absenteeism	.910				
Satisfaction of user	.851				
Higher confidence and morale	.823				
Improved Sustainability			.970		
Less Pollution			.970		
Minimization of waste			.970		
Investment in green building					.883
Recommending green building					.825
Occupying green building					.621
Extraction Method: PCA Rotation Method: Varimax					

Source: Author's own

The study applied principal component analysis (PCA) to summarize the number of items for each construct.

Using Varimax rotation, five components/factors are extracted. Water conservation, which was one of the items of cost saving benefits, is removed due to cross loadings. These factors further used in regression analysis, to evaluate the impact of benefits of SRED on investment in green commercial buildings. The proposed regression model in this case is:

$$IN = \alpha + \beta_1 HBV + \beta_2 PG + \beta_3 EG + \beta_4 CS + e \quad (1)$$

Table 4. Regression Analysis

Model	β	t	Sig.
(Constant)	2.071	3.308	.001
Higher Building Value (HBV)	.267	1.974	.051
Productivity Gains (PG)	.091	1.731	.087
Environmental Gains (EG)	.131	1.886	.062
Cost Savings (CS)	.048	.638	.525
a. Dependent Variable: Investment in green buildings (IN)			
F value			4.027
P - Value			.005
R Square			.141

Source: Author's own

According to the table 4, the overall regression model is statistically significant with an F value of 4.027. Results show that 14.1% of variance in the investment in green buildings is explained by the model. Individually, HBV, PG and EG are statistically significant in predicting IN at 0.1 level (10%). The direction of association of the independent variables is positive with investment in green buildings. The research is unable to find a significant relationship between cost savings benefit and investment in green buildings. On the basis of above results, the regression equation would be:

$$IN = 2.071 + 0.267\ (HBV) + 0.091(PG) + 0.131\ (EG) + e \quad (2)$$

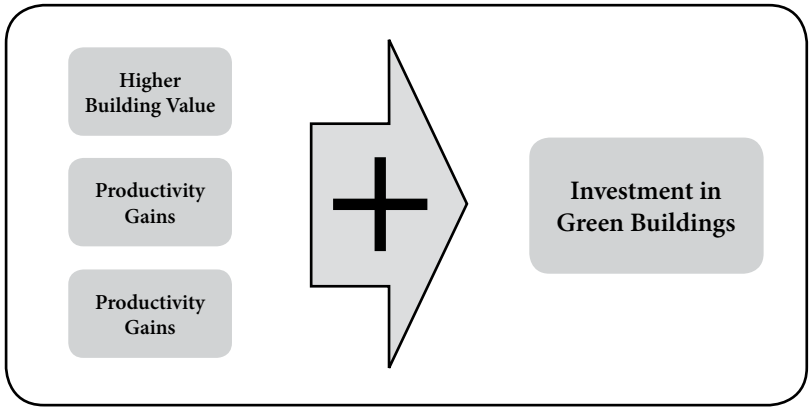
Due to insignificant association, the variable of cost savings is removed from the regression equation.

5. Discussion and Recommendations

In the previous section, the research paper examined the significance of SRED, and determined the impact of SRED's benefits on investment in the real estate. The results suggest that investors acknowledge the benefits of SRED and consider the associated benefits significant. It shows relatively high perceived value and importance of higher building value, productivity gains, cost savings and environmental gains as an attribute of SRED (green building). The results suggest that the attractiveness of the real estate sector can be enhanced by implementing sustainability in real estate development and establishing more green buildings. Moreover, the awareness about the benefits of implementing SRED is important among the investors.

The research finds a significant influence of the SRED's benefits (which include higher building value, productivity gains, and environmental gains) on investment in green buildings. Significant and positive associations between the variables suggest that higher perceived building value, productivity gains, and environmental gains leads to greater investment in green buildings (Figure 3).

Fig. 3. Relations between benefits of SRED and investment in green buildings



Source: Author's own

In other words, there is a direct relationship between the three SRED's benefits and investor's intention to occupy green commercial buildings. In order to determine the relationship between the SRED's benefits and intention/willingness to invest in commercial buildings, following hypotheses were examined (confirmed/ not confirmed):

H_1: The impact of higher building value due to SRED is significant on investment in green commercial buildings – H_1 was confirmed. Higher Building Value has a positive significant influence on the size of investment in green buildings.

H_2: The impact of productivity gains as achieved through SRED (green building) is significant on investment in green buildings – H_2 was confirmed. Productivity gains have a positive significant influence on the size of investment in green buildings.

H_3: The influence of cost saving through SRED is significant on investment in green buildings – H_3 was not confirmed. Cost savings don't have a positive significant influence on the size of investment in green buildings.

H_4: The influence of environmental gains is significant on investment in green buildings – H_4 was confirmed. Environmental gains have a positive significant influence on the size of investment in green buildings.

On the basis of the research findings, it is suggested to further enhance the awareness about the benefits of investing in green buildings. As sustainability in the real estate sector would positively influence environment, economy, and the overall society. Future studies, on the subject, may also consider secondary data on sustainability and investment to examine the relationship between the two variables. The current study relied on the data of 103 respondents, which need to be increased in future studies.

Conclusions

In the recent decades, significant changes are observed in the notion of "sustainability construction" with an aim to enable sustainability paradigm to the built environment. The building and real estate industry have a significant influence on the environment, economy and the society. Moreover, the significance of construction and real estate industry is associated with its role and size in social and economic development.

This research paper aims to explore the significance sustainable real estate development (SRED) and evaluate its impact on investment in real estate. The research study evaluates the significance of SRED and its impact of investment from the perspective of users of commercial buildings that are investors or owner of capital.

Primary data was collected by distributing survey questionnaire among the real estate investors, in the region of Austria, Vienna, Lower Austria. The questionnaire was initially distributed among one hundred and twenty (120) investors; however, after the completion of the survey only one hundred and three (103) questionnaires were found to be usable.

The research finds a significant influence of the SRED's benefits (which include higher building value, productivity gains, and environmental gains) on investment in green buildings. Significant and positive associations between the variables suggest that higher perceived building value, productivity gains, and environmental gains leads to greater investment in green buildings. The results suggest that the attractiveness of the real estate sector can be enhanced by implementing sustainability in real estate development and establishing more green buildings. Moreover, the awareness about the benefits of implementing SRED is important among the investors.

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