

Social Benefits Affecting Sustainable Real Estate Development: LEED Platinum Office Building^{*}

คุณประโยชน์มิติด้านสังคมที่ส่งผลต่อการพัฒนาโครงการอสังหาริมทรัพย์แบบยั่งยืน:
กรณีศึกษาอาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED ระดับ Platinum

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Abstract

The real estate industry and sustainable development consume an enormous amount of natural resources and energy. In Thailand, most of the primary energy consumption comes from local corporates and the business sector in the Bangkok metropolitan area, especially the office buildings that are increasing in number. The energy consumption of these office buildings also generates environmental problems, such as urban heat islands and global warming. Even though the office building development sector consumes massive amount of natural resources and energy, this sector shows progress in advanced sustainable real estate development. A great number of office building projects in Thailand appear to have high ranks for both the amount that are green certified and registrations to acquire certification under the LEED (Leadership in Energy and Environmental Design) standard.

This research aims to explore the system of social benefits affecting sustainable real estate development in Thailand. The analysis concentrates on three LEED Platinum office buildings located in Bangkok, Thailand, which are: 1) Energy Complex, 2) Park Ventures the

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Ecoplex, and 3) SCG 100th Year Building. Regarding the research methodology, the Delphi technique was used to acquire a consensus of the social benefits that are generated from LEED office development. Research data was collected from nineteen anonymous participants via rating scale questionnaires. The information was evaluated using the Delphi technique method to find which social benefits are considered in LEED Platinum office building development. The research outcome illustrates the social benefits that the key informants agree on, regarding the promotion of corporate social responsibility (CSR), corporate image, and marketing (variable 1). In contrast, the increase in employee and workforce productivity (variable 2), the improvement of the quality of life (variable 3), and the decrease of sick building syndrome (variable 4) are not considered as social benefits for the LEED office building development.

Keywords: LEED Platinum office building, Green office building, Office building development, Leadership in Energy and Environmental Design (LEED)

บทคัดย่อ

ภาคธุรกิจอสังหาริมทรัพย์มีการใช้ทรัพยากรธรรมชาติและพลังงานโลกอย่างมหาศาล อัตราการใช้พลังงานไฟฟ้าส่วนใหญ่ของประเทศไทยก็เกิดจากการใช้ของภาคธุรกิจอสังหาริมทรัพย์ โดยเฉพาะอาคารสำนักงานในเขตกรุงเทพมหานคร ซึ่งมีแนวโน้มการพัฒนาโครงการเพิ่มขึ้นทุกปีอย่างต่อเนื่อง ส่งผลให้เกิดปัญหาสิ่งแวดล้อมตามมา เช่น ปรากฏการณ์เกาะแห่งความร้อน ตลอดจนภาวะโลกร้อน แม้ว่าการพัฒนาโครงการอสังหาริมทรัพย์ประเภทอาคารสำนักงานจะมีการใช้พลังงานในสัดส่วนที่มาก แต่ในภาคการพัฒนาโครงการประเภทอาคารสำนักงานกลับแสดงออกถึงแนวทางการพัฒนาโครงการแบบยั่งยืน ดังมีสัดส่วนอาคารที่ยื่นขอการรับรองมาตรฐานอาคารเขียวและผ่านการรับรองมาตรฐานอาคารเขียวในสัดส่วนที่สูง โดยเฉพาะภายใต้มาตรฐาน LEED (Leadership in Energy and Environmental Design)

งานวิจัยนี้มุ่งศึกษาคุณประโยชน์มิติด้านสังคมที่ส่งผลต่อการพัฒนาโครงการอสังหาริมทรัพย์แบบยั่งยืนในประเทศไทย ผ่านอาคารกรณีศึกษา อาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED ระดับ Platinum จำนวน 3 อาคาร ได้แก่ 1) อาคาร Energy Complex 2) อาคาร Park Ventures the Ecoplex และ 3) อาคาร SCG 100 ปี งานวิจัยใช้เทคนิคเดลฟายในการวิเคราะห์คุณประโยชน์มิติด้านสังคมที่ส่งผลต่อการพัฒนาอาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED ระดับ Platinum เพื่อสรุปค้นหามาติจากกลุ่มผู้ให้ข้อมูลซึ่งเป็นผู้เชี่ยวชาญที่ผ่านการคัดเลือกจำนวน 19 ราย โดยผ่านแบบสอบถามที่มีการให้คะแนนแบบมาตราส่วนประมาณค่า ผลวิจัยพบว่าคุณประโยชน์ด้านการส่งเสริมบรรษัทภิบาล (CSR) ส่งเสริมภาพลักษณ์องค์กร และคุณประโยชน์ทางการตลาด (ตัวแปรที่ 1) เป็นคุณประโยชน์ที่กลุ่มผู้ให้ข้อมูลมีมติเห็นว่า เป็นคุณประโยชน์มิติด้านสังคมที่ส่งผลต่อการพัฒนาโครงการอาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED ระดับ Platinum ในขณะที่ การเพิ่มผลผลิตการทำงานของผู้ใช้อาคาร (ตัวแปรที่ 2) การส่งเสริมคุณภาพชีวิตที่ดีแก่ผู้ใช้อาคาร (ตัวแปรที่ 3) และการ

ลดอัตราการเจ็บป่วยจากอาคาร (ตัวแปรที่ 4) กลุ่มผู้ให้ข้อมูล ไม่มีฉันทามติในคุณสมบัติด้านสังคมที่ส่งผลต่อการพัฒนาโครงการอาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED ระดับ Platinum

คำสำคัญ: อาคารสำนักงานที่ได้รับการรับรองมาตรฐาน LEED, อาคารสำนักงานเขียว, การพัฒนาโครงการอาคารสำนักงาน, มาตรฐาน LEED

Introduction

The real estate development industry is widely known for its consumption of natural resources and energy. An American study by the U.S. Green Building Council (2016) revealed the impact of commercial building development on the world's natural resources and environment. The result of the study shows that the real estate sector in America accounts for up to 73 percent of the national electric energy consumption. Furthermore, the energy usage emits up to 38 percent of the carbon dioxide (CO₂), which causes the greenhouse effect. Occupants in these buildings consume up to 15 billion gallons of water per year, or 13.6 percent of the national water usage. Finally, these building users also produce a huge portion of garbage waste. Thus, we can generally see the effect that office building development has on society and the environment.

Likewise, in Thailand, up to 29 percent of electric energy consumption belongs to office buildings in Bangkok and metropolitan areas (Energy Policy and Planning Office, 2014); corporate buildings consumes up to 18.6 percent of the energy with a steady increase each year. That is why the temperature in Bangkok is getting warmer. Meanwhile, the heat in the atmosphere causes a greenhouse effect and urban heat island phenomena, which leads towards the effects of global warming.

These environmental problems are mainly the outcome of an unceasing number of office building development projects that are prone to be bigger, higher, and grander. Interestingly, in parallel to the growing commercial real estate development, more and more office building projects are proposed to become green certified and acquire certification under the LEED standard. The building category that contains the majority of submitted applications is that of the office buildings.

The rationale behind LEED certification for office buildings from the viewpoint of the real estate developer is to encourage an environmental-friendly concept and to reinforce competition among business sectors. Not only this, the green building concept ignites competitiveness in emerging green real estate development trends, and it actually reduces electric energy and other natural resources consumption. This could help eliminate

unnecessary costs and generate a better return on investment among business investors. The cycle of impact also goes towards the people who use the building. Once the internal building management functions well, the quality of living among the occupants will gradually increase. Moreover, this environmental concern correlates with a contemporary marketing trend, which could play a vital contributing factor in the marketing and promotion strategy for an office building's space. This concept also reflects a study by Solidiance (2013: 7-8) regarding the economy of green building projects in foreign countries and how the increase shows an impact in the same direction.

The concept of green buildings is the ultimate approach to sustainable development. The outcomes from the green building concept emphasize three main dimensions: environment, economic, and social. The overall standards for the green building concept are mainly focused on these three dimensions, for instance, the BREEAM (Building Research Establishment Environmental Assessment) standard of England, GREEN STAR of Australia, GREEN MARK of Singapore, and TREES (Thai's Rating of Energy and Environmental Sustainability) of Thailand. However, the most recognizable standard is LEED (The Leadership in Energy and Environmental Design) that originally started in America. This reputable standard is also well accepted in Thailand, and it was used to inspire the development of the TREES standard of Thailand.

Real estate developers and investors are likely to choose the LEED standard to certify their projects. The reason is that having the concept of a green building could generate a number of benefits that support sustainable development. The main benefits of green buildings are directed towards the environment, economy, and society.

Among the three dimensions, this study will be mainly focused on the emerging dimension of social benefits. In Thailand, there is still a lack of study in this area. The importance of social benefits resulting from green buildings has an interesting impact on whether we should pursue the idea of sustainable development and how the benefits gained by the building users from spending their time inside green buildings could influence the future of green buildings. Most importantly, how would the benefits expand to a bigger scale in our society?

The research methodology employed in this study was the Delphi technique. Data were collected from 19 anonymous key informants concerning LEED buildings in Thailand.

Objective

This research intends to investigate the various aspects of the social benefits associated with LEED Platinum Office Buildings in Bangkok, Thailand.

Methodology

The Delphi technique is suitable for gathering data from key informants within their area of expertise. The technique is designed to achieve a convergence of opinion or consensus on a specific issue. A quantitative research approach was used to scrutinize the social benefits associated with LEED Platinum office building development in Bangkok. By using the Delphi technique, research data from all nineteen informants was analyzed towards achieving a consensus regarding which aspects of the social benefits are considered to have an effect on LEED Platinum office building development. The statistics for the data analysis in the Delphi technique (Rowe and Wright, 1999) are the median, mean, and interquartile range (IQR). This research was designed to use 0 – 4 rating scale questionnaires to collect data from the key informants (Table 1). Each rating number on the questionnaires had a different meaning, as follows:

0 means key informants disagree that this benefit affects LEED Platinum office building development. If informants select “0”, they need to provide an additional perspective to clarify their distinctive opinion.

1 means key informants partially agree that this benefit affects LEED Platinum office building development.

2 means key informants agree that this benefit affects LEED Platinum office building development.

3 means key informants mostly agree that this benefit affects LEED Platinum office building development.

4 means key informants completely agree that this benefit affects LEED Platinum office building development. If informants select “4”, they need to provide an additional perspective to clarify their distinctive opinion.

Rating scale questionnaires (Table 1) were used as the tools to collect data from all key informants with the Delphi technique. The researchers used a 0 – 4 rating scale to obtain clear and distinctive opinions from all key informants. The study analyzed the consensus of the informant group at the 80th percentile, in which each variable needs to cover all statistic criteria: median value (≥ 3.20), mean value (≥ 3.20), and IQR (≤ 1.20) (Table 2). By covering the statistic criteria as mentioned, the research result means that the key informants completely

agree that this benefit affects LEED Platinum office building development. All research data were processed using Microsoft Excel software version 2010.

Table 1: Example of 0 – 4 rating scale questionnaire with Delphi technique.

Social benefits	Social benefits affecting LEED Platinum office building					No comment
	Disagree (0) Give opinion	Partially agree (1)	Agree (2)	Mostly agree (3)	Completely agree (4) Give opinion	
Promoting corporate social responsibility (CSR), corporate image, and marketing						

Table 2: Meanings of consensus values.

Median	Percentile	Mean	Mode	Meanings
<1.2	30.00	1.20	0.00	Key informants <u>disagree</u> that this benefit affects LEED Platinum office building
0.81 - 1.59	50.00	2.00	1.00	Key informants <u>partially agree</u> that this benefit affects LEED Platinum office building
1.60 - 2.39	60.00	2.40	2.00	Key informants <u>agree</u> that this benefit affects LEED Platinum office building
2.40 - 3.19	70.00	2.80	3.00	Key informants <u>mostly agree</u> that this benefit affects LEED Platinum office building
≥3.20	80.00	3.20	4.00	Key informants <u>completely agree</u> that this benefit affects LEED Platinum office building

Population and Sampling

Nineteen anonymous key informants were selected by using Macmillan's (1971: 11) research method. To meet a stability of error, the research must have at least 17 participants (Table 3). From the 19 key informants, the research stabilized the error reduction at 0.50 and the net change of error at 0.02. All 19 key informants (Table 4) were selected from experts participating in green office building development, and consisted of real estate developers, high-level managers, and LEED Accredited Professionals (LEED AP).

Table 3: Error reduction related to key informant size.

Key informant size (persons)	Error reduction	Net change of error
1 - 5	1.20 - 0.70	0.50
5 - 9	0.70 - 0.58	0.12
9 - 13	0.58 - 0.54	0.04
13 - 17	0.54 - 0.50	0.04
17 - 21	0.50 - 0.48	0.02
21 - 25	0.48 - 0.46	0.02
25 - 29	0.46 - 0.44	0.02

Source: Macmillan (1971: 11)

Table 4: Information on key informants.

Information	LEED Platinum office building A	LEED Platinum office building B	LEED Platinum office building C	LEED AP
Number of key informant (persons)	3	5	4	7
Position and work experience (years)				

Position	LEED Platinum office building A	LEED Platinum office building B	LEED Platinum office building C	LEED AP
Director / Executive officer	12	15	7	
		5		
Senior manager / Project manager	12	5	32	
			10	
Manager	3	3	8	
		5		
LEED Accredited Professional (LEED AP)				8
				7
				11
				13
				8
				3
				10

This study selected the example of green buildings in Thailand using the following qualifications:

- 1) The building must be from an entirely new construction, not a renovation.
- 2) The building must have the LEED standard at the Platinum level.
- 3) The building must be located in Bangkok.

Table 5 summarizes all eight of the green buildings in Thailand that have the LEED standard at the Platinum level. However, only three buildings possess all three of the above qualifications, and they are 1) Energy Complex, 2) Park Ventures the EcoPlex, and 3) SCG 100th Year Building.

Table 5: List of all LEED Platinum projects in Thailand arranged by certification date (reexamined on March 3rd, 2016).

No.	Project name	Certified date	Type of certification	Version	Certification level
1	Energy Complex	July 17 th , 2010	Core and Shell	V2.0	Platinum
2	SCG Building 5 (SCT)	July 6 th , 2012	Existing Buildings	V2009	Platinum
3	SCG Head Office Building 1 and 2	September 21 st , 2012	Existing Buildings	V2009	Platinum
4	Park Ventures the Ecoplex	November 27 th , 2012	Core and Shell	V2009	Platinum
5	HSBC Green Library	June 23 rd , 2013	New Construction	V2009	Platinum
6	SCG 100 th Year Building	January 28 th , 2014	Core and Shell	V2009	Platinum
7	Global Power Synergy Company Limited	March 19 th , 2014	Commercial Interiors	V2009	Platinum
8	The Style by Toyota	September 29 th , 2015	Commercial Interiors	V2009	Platinum

Source: <http://www.usgbc.org/projects/list?page=9503>



Figure 1 – 3: Research case studies (from left to right): 1) Energy Complex, 2) Park Ventures the Ecoplex, and 3) SCG 100th Year Building.

Sources: <http://www.energycomplex.co.th>

<http://www.applicadthai.com>

<http://www.scgbuildingmaterials.com>

Data Collection

In this work, 0 to 4 rating scale questionnaires were used to acquire opinions from the nineteen anonymous key informants regarding the social benefits affecting on LEED Platinum office building development. The research data were analyzed using the Delphi technique.

Literature review

The common perception of Sustainable Development is focused on the balance between the development of human society (social dimension), the economy (economic dimension), and natural resources (environment dimension). The optimal outcome from sustainable development is an increase in productivity from the human resources. When society can retain adaptability to change and become environmentally conscious, it will fairly create major benefits for everyone in that society. Therefore, sustainable development is considered to be an important factor because it directly affects our way of life, such as improving the quality of life and enhancing productivity. It can also have a direct effect on organizations, for example, promoting a positive corporate image by reflecting corporate social responsibility (CSR).

Pholphirul (2014) pointed out the benefits of green building in the social dimension regarding the economists' emphasis on external benefits or non-monetary benefits when investing in green office buildings. Green office buildings can further provide health benefits and job satisfaction when compared to conventional office buildings. After surveying data from questionnaires and performing statistical comparisons between employees working in green office buildings and conventional office buildings, it was found that **the employees in green office buildings have a higher performance rate, better quality of life, and lower rate of sick building syndrome* than the employees working in non-green buildings**. This is coherent with Phianphikun's study (2011: 3) that discusses the benefits of green building in a social dimension by referring that The World Health Organization (WHO) that found 20% of the US and Western populations show symptoms of sick building syndrome, which resulted in a 14% reduction in productivity. Due to the 15% energy and atmosphere assessment criteria in the LEED standard, this can be seen as a testimony to the fact that green office building users have dramatically **improved productivity and, reduced building caused illnesses**.

* Sick building syndrome comprises various nonspecific symptoms that occur in the occupants of a building. This feeling of ill health increases sickness absenteeism and causes a decrease in productivity in the workers (Joshi, 2008: 61).

Although the social dimension is a factor that cannot be clearly measured, such as increases in the productivity of green building users or increased positive corporate image. It is a major factor that affects the decision to rent spaces in an office building. In particular, for organizations dealing with petroleum, banks, and government related organizations, there is a tendency to choose a green building as an office building to create a positive image. In addition, Persram, Lucuik, and Larsson (2007: 3-4) found that more than **40% of leading companies in America believe that the absence of green building offices will negatively impact the company's marketing strategies and public relations**. The study also points out that 68% of the top US companies using green office buildings receive better returns on investment when compared to companies that opt for a typical office building. Chanyaraksakul (2012: 33) supported that building users have **less illness and sick leaves. Business owners also have a better corporate image, public relations, and CSR**.

Kok, Bauer, Eichholtz, and Quigley (2010: 4-6) suggested that there is a common understanding that **green buildings produce a safer and healthier indoor environment**. Although scientific data for this statement is lacking, numerous studies have claimed to discover a bond connecting improved employees' (building users) well-being, as measured by increased productivity, and better indoor air condition. The potential gains of decreased sick leave and productivity gains are sufficient support to bring attention to the topic, as employee costs represent the majority of total expenses for an average company. Many companies choose to take this seriously, for instance, Genzyme, a biotech company, relocated operations to a LEED Platinum labeled building in Cambridge, Massachusetts. The cause for relocation was to reduce employee sick leave. The choice of green space may also emerge from efforts to **improve corporate reputation and corporate branding in environmental leadership**, which seems to be a critical determinant for prospective employees. While human capital is regarded as a key success for value adding from a modern firm's perspective, there is still an inelastic supply of skilled employees in some industries. A green-rated corporate space may help attract and retain a high-quality labor force.

Furthermore, according to Kok, Bauer, Eichholtz, and Quigley (2010: 4-6), buttressed green space may help to demonstrate the social and environmental awareness of a company and indicates the ecological responsiveness of the corporation. Additionally, this can compensate for a negative environmental corporate image for firms in notorious industries. For example, Chevron, an American multinational energy corporation, has recently built a LEED-certified "green campus" in Louisiana. The decision to build a green space can further heighten the ethical reputation of a firm, which may attract a certain portion of the market.

For instance, Wal-Mart, an American multinational retailing corporation has opened numerous “green” stores over the past few years, as part of their larger strategic considerations on environmental problems. In fact, it is proven that consumers are the ones making corporations go “green”. Thus, most occupiers are also beginning to realize an enhanced brand reputation from using a sustainable building, and **improved productivity and decreased absenteeism from higher-quality indoor environments are some of the many advantages that occupants can expect from using a green building.**

However, Eichholtz, Kok, and Quigley (2010: 3) mentioned the intangible effects of the label itself (worker productivity or improved corporate image), for example, appearing to represent a notable role in recognizing the importance of green buildings in the marketplace. The study showed interesting points that seem to be the trend in the green movement. They stated that the leading companies in the oil and banking industries, as well as government-related firms, are among the most prominent green tenants. Their analysis shows that these companies are significantly more inclined to rent green office space. They also addressed tenant composition in green buildings as opposed to regular non-green office buildings. The outcomes imply that, when controlling for differences in quality and unobserved locational characteristics, tenants are more concentrated in green buildings, occupying larger shares of the buildings. This may indicate a **trend of desire to use a building as a flag to signal commitment to CSR**. This is supported by the research finding of Persram, Lucuik, and Larsson (2007: 3-4), who suggested that 40% of corporate leaders in the U.S. believe that ignoring green buildings will result in marketing and public relations problems. In addition, Rawlinson and Langdon (2007) supported the green trend that a sustainability agenda is developing quickly and fostering large corporate to reduce their carbon footprints, thereby giving credibility to the corporate sustainability and social responsibility. With client expectations changing rapidly, developers and funders are increasingly required to promote a sustainability agenda that goes beyond compliance with regulations. The Pennsylvania Environmental Council (2008) buttresses that **green buildings improve human health and productivity and make economic sense**, such as green job opportunities and immediate savings on their utility bills. Regarding the improved human productivity in the United States, children who are educated in green classrooms score as much as 20% higher on standardized tests. In green offices, workers experience productivity gains as high as 17%. Last but not least, Langdon (2007: 91-106) stated that the pursuit of green ratings is becoming increasingly relevant to both building owners and tenants. There are several benefits for building owners including the

reduced risk of obsolescence, higher demand from institutional investors, and being mandatory for government tenants.

According to the literature review, the social benefits affecting LEED office building development could be summarized into four variables as follows:

Variable 1: Promoting CSR, corporate image, and marketing.

Variable 2: Increasing employee and workforce productivity.

Variable 3: Improving quality of life.

Variable 4: Lowering sick building syndrome.

Data Analysis

The research findings illustrate variable 1: promoting CSR, corporate image, and marketing indicates a median value of 3.85, mean value of 5.12, and IQR value of 0.50. From Table 6, the result demonstrates that variable 1 is the only variable that passes the consensus criteria according to the Delphi technique, in which the variable needs to cover all of the median value ≥ 3.20 , mean value ≥ 3.20 , and IQR ≤ 1.20 . The other three variables did not pass all the above criteria, and failed due to the median value.

Table 6: Consensus data of four variables analyzed by Delphi technique.

Social Benefits	Median (≥ 3.20)	Mean (≥ 3.20)	IQR (≤ 1.20)
Variable 1: Promote CSR, corporate image, and marketing	3.85	5.12	0.50
Variable 2: Increase employee and workforce productivity	3.00	4.38	0.88
Variable 3: Improve quality of life	3.00	5.14	0.63
Variable 4: lower sick building syndrome	3.00	4.09	0.50

Results and Discussions

The research outcome concludes that to “promote CSR, corporate image, and marketing” is the social benefit that affects LEED office building development.

From the 19 key informants, the consensus data shows that promoting CSR, corporate image, and marketing (variable 1) is the social benefit that affects LEED office building development. This variable represents a median value of 3.85 from ≥ 3.20 , mean value of 5.12 from ≥ 3.20 , and interquartile range value of 0.50 from ≥ 1.20 . Whereas, the rest of the variables, which are increasing employee and workforce productivity (variable2), improving quality of life (variable 3), and lowering sick building syndrome (variable 4), fail to

cover all the required criteria, as indicated in Table 6. The result corresponds with the study of Eichholtz, Kok, and Quigley (2010: 3) where the decision making process for renting a space of over 11,000 units relies on the CSR image. Companies or building users who are in the coal mine industry, construction, and public administration or with a high level of human capital desire to rent a space in office buildings that are **green certified as it helps promote CSR and corporate image**. This trend seems to gain considerable attention in the real estate development industry. Not only does this trend urge a change in behavior among building users and investors in the real estate industry, but it also encourages society to be aware of the sustainable development. Ruenmol et al. (2016: 528) explained that the concept of social responsibility refers to responsibility toward society and the environment. Organizations should contribute to society by showing responsibility to sustain those living in the same society. This would include creating a good image of the organization and conducting corporate social responsibility activities as a means of gaining a marketing advantage via establishing, creating and promoting a good image of the organization. This is supported by Lomlao et al. (2016: 631) who indicated that CSR is defined as the activities of an organization or society via marketing strategy implementation that mainly focuses on social issues. However, Mongkolkachit (2016: 24) suggested if there is a corporate desire to use CSR as a strategic tool, they should primarily be financially strong and have sufficient resources to increase social value at large.

In addition, the study of Kok, Bauer, Eichholtz, and Quigley (2010: 4-6) presented the **social benefit to corporate image that comes from green buildings. This benefit plays a significant role, especially in organizations with notorious images towards environmental issues**. For example, the petroleum industry and other types of companies that have direct negative impacts on the environment. Kok, Bauer, Eichholtz, and Quigley (2010: 4-6) also mentioned **product and brand benefits that could derive from having a good corporate image from green buildings**. Companies want to be leading brands by showing an image related to environmental concern. In addition, this could attract qualified human resources, applicants with high qualifications may apply for job with organizations that have good CSR images. It is clear to see what benefits green building could bring in turn. This logic also matches the study of Rahmawati, Hadiwidjojo, and Solimun (2014: 6) where **green buildings result in a good corporate image, CSR, and help the company's marketing approach**.

Chanyaraksakul (2012: 33) indicated that the promotion of corporate image is a good public relations strategy because these business operators and building users could be examples and spread the trend to society regarding CSR.

The study of Persram, Lucuik, and Larsson (2007: 3-4) indicated that over 40 percent of leading companies in America believe that the conventional style office building could create a negative impact on marketing and public relations strategy. The research of Persram, Lucuik, and Larsson (2007: 3-4) showed that 68 percent of leading companies in America who have green office buildings shows satisfactory returns on investment compared to traditional buildings. Kok, Bauer, Eichholtz, and Quigley (2010: 4-6) also supported that a company with good CSR would be able to lure the segment of the customers with environmental concerns.

Kotler and Lee (2005: 23) mentioned the use of CSR in the marketing concept to build awareness among consumers. Therefore, **corporate social marketing could encourage consumers to protect the environment and clear pollution, which stimulates a change in consumer behavior or behavior change**. In a nutshell, CSR is used as a benchmark in marketing implementations. Meanwhile, the organization would have to promote the value of CSR to the society. The study of Persram, Lucuik, and Larsson (2007: 3-4) suggested that 40% of corporate leaders in the U.S. believed that ignoring green buildings would result in marketing and public relations problems.

Conclusions

To investigate the various aspects of the social benefits associated with LEED Platinum office buildings in Bangkok, Thailand, this research examined four variables of social benefits affecting LEED office building development using the Delphi technique. The social benefit that key informants agreed on was promoting CSR, corporate image, and marketing (variable 1). In contrast, increasing employee and workforce productivity (variable 2), improving quality of life (variable 3), and lowering sick building syndrome (variable 4) were not considered as social benefits of LEED office building development. The research results could generate many contributions to Thai society. The Thai government could initiate a tool to create a sustainable development policy, especially for green building development in Thai society, such as real estate tax incentive program, floor area ratio (FAR) bonus plan and reward policy. In addition, the Thai Green Building Institute (TGBI) could apply the finding to meliorate the TREES rating standard to drive green real estate development that meets the developers' and users' goals, for example, green corporate promoting program and fostering cooperation between the institute, developers, investors and building users.

References

- Chanyaraksakul, Pimpida. (2012). “Green Building Benefits ประโยชน์ที่ได้รับจากการพัฒนาเป็นอาคารเขียว.” **Construction and Property**, 32.
- Eichholtz, P., Kok, N., & Quigley, J. (2010). **Why do companies rent green? Ecological Responsiveness and Corporate Real Estate**. Institute of business and economic research, Ficher center for real estate and urban economics: Program on housing and urban policy, (W09-004), Accessed on 11 November 2016, from http://urbanpolicy.berkeley.edu/pdf/Who_Rents_Green_Journal_Version_NK071310.pdf
- Energy policy and planning office. (2014). **Thailand Energy Statistic 2014: Chapter 5 Electricity**. Accessed on 5 July 2017, from <http://www2.eppo.go.th/info/cd-2015/pdf/cha5.pdf>
- Joshi, S. (2008). “The Sick Building Syndrome.” **Indian Journal of Occupational and Environmental Medicine**, 12(2): 61-64.
- Kok, N., Bauer, R., Eichholtz, P., & Quigley, J. (2010). **How green is your property portfolio? The environmental performance of commercial real estate**. Institute of Business and Economic Research, Ficher center for real estate and urban economics: Program on housing and urban policy. Accessed on 11 November 2016, from <http://escholarship.org/uc/item/7tb01776#page-1>
- Kotler, P. and Lee, N. (2005). **Corporate Social Responsibility**, New Jersey: John Wiley & Sons.
- Langdon, D. (2007). “The Cost and Benefits of Achieving Green Buildings. Innovative thinking in property and construction. LEED and ENERGY STAR Development Options.” **Journal of Sustainable Real Estate**, 1(1): 91-106.
- Lomlao, P., Pasusirirod, T., Phoophai boon, S., and Siriwong, P. (2016). “The Social Construction of Meanings and Corporate Social Responsibility Practicing Concept to Needs of Staff of TPI Polene Public Company Limited.” **Veridian E-Journal Vol. 9**, No. 1 (January-April): 630-642.
- Macmillan, T. (1971). **The Delphi Technique**, Paper presented at the annual meeting of the California Junior Colleges Associations Committee on Research and Development, Monterey, California. (May 1971).
- Mongkolkachit, P. (2016). “The Impact of Corporate Social Responsibility on Firm Performance: Empirical Study of Thai Public Listed Companies.” **Veridian E-Journal Vol. 9**, No. 5 (July-December): 24-36.

- Pennsylvania Environmental Council, Inc (2008). **Building Green: Overcoming Barriers in Philadelphia**, Accessed on 29 March 2017, from http://www.pecpa.org/files/2-27-08_BuildingGreen_FINAL.pdf
- Persram, S., Lucuik, M., and Larsson, N. (2007). **Marketing Green Buildings to Tenants of Leased Properties**. Prepared for the Canada Green Building Council. Marketing Green Buildings to Tenants of Leased Properties: 1-12.
- Phianphikun, Kamonthip. (2011). **Economics of Green Office Building in Thailand**. Accessed on 16 June 2017, from <http://www.econ.nida.ac.th/attachments/article/2852/4.pdf>
- Pholphirul, Piriya. (2014). **Economics of Green Building**. Accessed on 4 July 2017, from http://piriya-pholphirul.blogspot.com/2014/05/economics-of-green-building_28.html
- Rahmawati R., Hadiwidjojo D., and Solimun N. (2014). “Green marketing mix as strategy to improve competitive advantage in real estate developer companies.” **International Journal of Business and Management Invention**, 3(11): 6-12.
- Rawlinson, S., and Langdon, D. (2007). **Sustainability Offices**. Accessed on 25 June 2017, from http://www.davislangdon.com/EME/Research/ResearchFinder/SustainabilityPublications/SustainabilityOffices_Jan07
- Rowe, G. & Wright, G. (1999). The Delphi technique as a forecasting tool: issues and analysis. **International Journal of Forecasting**, 15: 353-375.
- Ruenmol, C., Ruenmol, C., Suttiprasit, N., Sungrugsa, M., and Siriwong, P. (2016). “Investigate Meanings, The Original of Meaning, and Corporate Social Responsibility Activity in Accordance of Staffs’ Requirement from Krungthai Bank Headquarters.” **Veridian E-Journal Vol. 9**, No. 2 (May-August): 527-536.
- Solidiance. (2013). **Thailand’s Green Buildings Goals Aspirations & Realities**. Accessed on 15 May 2017, from <http://www.solidiance.com/whitepaper/thailands-green-building-goals-aspirations-vs-realities.pdf>
- U.S. Green Building Council. (2016). **What is LEED certification?**. Accessed on 6 June 2017, from <http://www.usgbc.org/articles/about-leed>.