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EXPLORING GREEN MARKETING FACTORS INFLUENCING CONSUMERS' PURCHASE INTENTIONS TOWARD GREEN BUILDINGS

The natural environment has become imbalanced as the demand for natural resources increases daily and resources are rapidly depleted, resulting in global warming. At this point, humans have gradually become aware of ecological crisis. As consumer environmental awareness increases, enterprises have developed the so-called green marketing in response to consumer demands. The major purpose of this study is to examine the consumers' cognition regarding green marketing factors in the context of green residential buildings. Followings are the two major findings of this empirical research: 1. When deciding whether to buy a green house, the 3 most important factors to consider for consumers are: (1) good natural ventilation, (2) abundant natural lighting, and (3) designs that include window shades. 2. Through the factor analysis, 4 green marketing dimensions are found: (1) energy-saving and comfortable spaces, (2) green business demands, (3) ecological greening and water retention, and (4) carbon reduction and pollution prevention.

Keywords: *green marketing; green buildings; consumer cognition.*

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ВПЛИВ РІЗНОМАНІТНИХ ЧИННИКІВ "ЗЕЛЕНОГО МАРКЕТИНГУ" НА НАМІР ПРИДБАТИ "ЕКО-БУДИНОК"

У статті коротко описано сучасну незбалансованість навколишнього середовища та стан справ навколо "глобального потепління", що разом призвело до розуміння людством загрози екологічної кризи. Підвищення екологічної свідомості споживачів змусило підприємства розробляти стратегії з так званого "зеленого маркетингу". Досліджено сприйняття споживачами різноманітних чинників "зеленого маркетингу" у секторі нерухомості. При придбанні "еко-будинку" споживачі приділяють найбільше уваги 3 основним чинникам: 1) гарній природній вентиляції; 2) потужному природному освітленню; 3) дизайну вікон, що передбачає ставні. За допомогою факторного аналізу виділено 4 виміри "зеленого маркетингу": 1) енергозбереження та комфортний простір; 2) потреби "зеленого бізнесу"; 3) озеленення та вологопоглинання; 4)зниження рівня викидів вуглецю та інших забруднювачів в атмосферу.

Ключові слова: *"зелений маркетинг"; "еко-будинок"; свідомість споживачів.*
Табл. 2. Літ. 10.

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ВЛИЯНИЕ РАЗЛИЧНЫХ ФАКТОРОВ "ЗЕЛЁНОГО МАРКЕТИНГА" НА НАМЕРЕНИЕ КУПИТЬ "ЭКО-ДОМ"

В статье коротко описаны современная несбалансированность окружающей среды и положение дел вокруг "глобального потепления", что вместе привело к пониманию человечеством угрозы экологического кризиса. Повышение экологической сознательности потребителей заставило предприятия разработать стратегии так называемого "зелёного маркетинга". Исследовано восприятие потребителями различных факторов "зелёного маркетинга" в секторе недвижимости. При покупке "эко-дома" потребители уделяют большее внимание 3 основным факторам: 1) хорошей естественной вентиляции; 2) обильному природному освещению; 3) дизайну окон, предполагающем ставни. При помощи факторного анализа выделены 4 измерения "зелёного маркетинга":

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1) энергосбережение и комфортное пространство; 2) потребности "зелёного бизнеса"; 3) озеленение и влагопоглощение; 4) снижение уровня выброса углеводорода и других загрязнителей атмосферы.
Ключевые слова: *"зелёный маркетинг"; "эко-дом"; сознание потребителей.*

Introduction. Since the industrial revolution in the eighteenth century, the demand for natural resources has increased drastically and resources have been depleted rapidly, resulting in global warming. At both the 1992 Earth Summit and the 1998 Kyoto Conference on the environment, creating a green environment was discussed. In 2009, the World Wildlife Federation (WWF) indicated that global warming could cause the Arctic ice caps melt, causing flooding that would affect one-fourth of the world's population. Thus, sustainable development has become the most important topic for modern society under increasing international attention. The influence of green thinking has gradually stimulated the mainstream awareness of healthy, waste-reducing, low-pollution, resource-conserving green products.

Skyscrapers with glass walls, which are an example of high-energy consumption buildings, can be observed in the cities all over the world. Massive consumption of energy not only faces the challenge of uncertain energy supply, but can also lead to irreversible environmental damage. The energy consumed and carbon dioxide emitted by buildings has reached 29% of the total greenhouse gas emissions in Taiwan (Architecture and Building Institute, Ministry of the Interior, 2007). Thus, the construction of "ecological, energy-conserving, waste-reducing, and healthy" green buildings can satisfy the need for sustainable development and green consumption trends. Efforts to protect environment have become an urgent and important topic in the current "post-global warming" era. In the past, residential markets featured developers unilaterally designing, constructing, completing, and selling homes to consumers. However, what green factors are consumers actually concerned about? Which factors are unimportant to consumers? Searching for the answers to these questions is the primary motivation for this study.

Because the purchase of a house is a significant consumption decision with far-reaching consequences, consumer cognition is closely linked to emotions and the intent to purchase. In this study, we investigated and analyzed the factors which are the most important for consumers considering the purchase of a green house in Taipei, Taiwan.

Literature Review. The most critical purpose of promoting green buildings is to mitigate environmental damage, greenhouse effects, and global warming. The twenty-first century is the era of environmental consciousness, and green buildings have become highly favored as a way to alleviate the problem of urban environmental degradation. Environmental protection-oriented "green buildings" are the most effective response in building policy.

The term "green" has become a byword for environmental protection. Terms such as "green consumption" and "green life" have become trendy phrases familiar to public. Using "green buildings" as a term for eco-friendly buildings facilitates their promotion. The review and update of the "Evaluation Manual for Green Buildings in Taiwan" by the Architecture and Building Institute, Ministry of the Interior, defined green buildings as "eco-friendly, energy-conserving, waste-reducing and healthy buildings."

Applications for "Green Building Certification" in Taiwan are evaluated on the basis of the following 9 performance indicators: water retention, water resources, daily energy conservation, carbon dioxide emissions, waste reduction, wastewater improvements, biological diversity, and interior environment. These 9 indicators are intended to support the 4 major categories of evaluation criteria for green buildings: eco-friendly, energy-conserving, waste-reducing, and healthy-features. The development of reliable standards and evaluation criteria can provide positive and objective standards for green buildings, which can be recognized as green buildings after satisfying evaluation standards and receiving certification from a green building evaluation committee.

The 1990s were a crucial era, with a number of people calling this period the "Earth Decade" (Kotler, Armstrong, 1991); some people also considered environmentalism as the crusade of the 1990s. Natural environment began to have a practical influence on market sales in the 1990s, leading to the development of "green marketing" (Shrivastava, 1994).

Coddington (1993) defined green marketing as to "conduct self-expectations as environmental managers, and adopt green marketing philosophies as a developmental responsibility and opportunity for enterprises." To classify green marketing factors, however, we refer to the definition provided by Prakash (2002) for green marketing, that is, "green marketing is the introduction of green products and the implementation of the business greening concept." Thus, we categorized green marketing factors into 2 categories – green product cognition and green business cognition. The concept and the processes of "sustainable development" have emerged since natural environment was severely damaged by industrial pollution. Liao (2003) showed that the ratio of consumer behavior that constitutes "green consumption behavior" increases when consumers have stronger or more positive intentions toward green products.

Klassen and Mclaughlin (1996) analyzed the relationship between eco-friendly performance and corporate image. They found that, with the appropriate effort, environmental protection performance yields positive benefits for shaping a company's image (cited in Shi, 2006). Liao (2003) showed that a stronger and more positive consumer understanding of green products increases the ratio of "green consumption behaviors." In general, consumers' subjective attitude and image have been formed through the experienced perception of green products, services, or social activities which are provided by enterprises (Dowling, 1986). Therefore, we can recognize that consumers' cognition of green marketing factors directly influences their intentions to select green houses.

Research scope. In this study, we examined typical consumers in the Greater Taipei region in relation to green home products to identify the points of difference between consumers regarding various green marketing factors. Finally, we investigated whether consumers' intentions to select green homes were influenced by differences in their cognition regarding green marketing factors.

Variables definition and measurement. This study incorporated green marketing factors most commonly used by developers, as collected by Fang (2005) from the billboard and online advertisements of 30 developers of residential products in Taiwan between 2001 and August 2005. A 5-point Likert-type scale was used to measure these factors.

Research population and sampling design. Because most green building projects are located in urban areas, for this study, we selected consumers who were at least 20 years old living in the Greater Taipei area as the research targets.

According to the data from the Architecture and Building Institute, Ministry of the Interior, only an extremely small proportion of building projects receive green building certification. Thus, this field is relatively unfamiliar to public.

Obtaining effective surveys that showed the differences in product knowledge and cognition using a random sampling method would have been difficult. Therefore, because one of the researchers of this study are working in a development company, associates in the building industry (in addition to friends and family) were persuaded to fill the surveys. This method ensured that both high- and low-knowledge samples were obtained. Thus, the sampling method adopted for this study was non-random judgment sampling. To realize the concept of energy-conservation and carbon-reduction methods, the survey was primarily completed online, but the paper copies were used as a supplement. Additionally, to increase the returned rate, online distribution was followed by telephone communication or personal visits.

Reliability analysis. The result of the reliability analysis for "green marketing factor cognition" showed that the α coefficients for this variable are 0.86, which indicated strong reliability of the data collected.

Samples returned and their structure analysis. The total of 396 questionnaires were issued. After excluding the incomplete ones, there were 332 effective samples showing the returned rate of 83.3%. The sample was evenly distributed considering the demographic variables such as gender and age; most respondents had at least undergraduate university education. Additionally, most respondents were employed in business (including services) and development/construction industries, earning between $30,000 and $50,000 NTD (US$1 is about NT$30) per month, and were married.

When the respondents were asked whether they would prioritize the selection of a green home, 309 responded "Yes," constituting 93.1% of the overall sample. When asked whether they were willing to pay higher price for a green home, 243 responded "Yes," constituting 73.2% of the sample.

Factor analysis of green marketing factors. To test the construct validity and communality, we performed the communality testing of 22 green marketing factors. The results are shown in Table 1. The communality of 0.5 was used as the standard. After excluding the items with values less than 0.5, 17 green marketing factors remained for factor analysis.

Factor analysis results and identifying the green building marketing factor dimensions. For this study, we conducted the principal component analysis, using Varimax to rotate the 17 residence green marketing factors. The rotation produced the factor composition matrix shown in Table 2.

Based on the factor analysis, we identified the various dimensions according to the principles of faithfulness, expressiveness, and elegance, as follows:

1. Energy-saving, comfortable spaces: The elements included in Factor 1 were all related to "energy-saving" and consistent with the physical factors of air, heat, light, and water, which influence the comfort of a building environment.

2. Green business demands: The elements included in Factor 2 were either related to the protection of peripheral environment by the developer or to eco-friendly green home concepts.

3. Ecological greening and water retention: Factor 3 includes the elements related to respecting the original natural ecology, green spaces, and water/soil retention functions.

4. Carbon reduction and pollution prevention: The elements included in Factor 4 refer to the importance of pollution prevention.

Table 1. **Communality testing of green marketing factors**

Item	Communality	Item	Communality
Quantity of green building residence product projects	*0.466*	Uses "window shades"	0.706
Developer often appears in media interviews	0.601	*Utilizes solar-powered water heaters*	*0.457*
Developer provides information on environmental protection	0.667	Power-saving LED lighting used for public spaces	0.594
Developer provides online virtual viewings	*0.252*	Structural use of simple, symmetrical designs	0.584
During construction, avoids polluting the environment	0.784	Installation of specific garbage sorting space	0.661
Assists the community in promoting environmental protection	0.753	*Establishment of strengthened waste management*	*0.486*
Site has an "extremely high greening ratio"	0.574	Use of carbon-absorbent boreal forest materials	0.657
Development considers geography and water systems	0.663	"Good natural ventilation" in residences	0.637
Seeks to preserve trees and green spaces on site	0.575	Use of "water-conserving bathroom equipment"	0.547
Permeable pavement used for outdoor construction	0.659	Use of green-certified construction materials	0.546
Abundant "natural lighting" in residences	0.653	*Use of airtight windows and other soundproof materials*	*0.497*

Note: The excluded green marketing factors had the communality values of less than 0.5.

Table 2. **Factor composition matrix resulting from the rotation of green marketing factor dimensions**

Green marketing factors	Factor 1	Factor 2	Factor 3	Factor 4
"Good natural ventilation" in residences	**0.777**	0.116	0.069	0.244
Uses "window shades"	**0.727**	0.123	0.376	0.118
Abundant "natural lighting" in residences	**0.680**	0.191	0.392	0.149
Use of "water-conserving bathroom equipment"	**0.649**	0.100	0.145	0.404
Power-saving LEDlighting used for public spaces	**0.634**	0.130	0.215	0.305
Assists the community in promoting environmental protection	0.153	**0.873**	0.075	0.019
During construction, avoids polluting the environment	0.246	**0.867**	0.019	-0.020
Developer provides information on environmental protection	0.138	**0.797**	0.130	0.111
Media reports that the developer participates in green activities	-0.093	**0.644**	0.360	0.184
Development considers geography and water systems	0.325	0.110	**0.738**	0.113
Seeks to preserve trees and green spaces on site	0.239	0.083	**0.723**	0.200
Permeable pavements used outdoors to facilitate water retention and flood prevention	0.394	0.117	**0.666**	0.205
Site has an "extremely high greening ratio"	0.044	0.210	**0.650**	0.301
Installation of specific garbage sorting space	0.212	0.051	0.175	**0.755**
Use of carbon-absorbent boreal forest materials	0.136	0.060	0.275	**0.748**
Structural use of simple, symmetrical designs	0.369	0.072	0.119	**0.677**
Use of green-certified construction materials	0.443	0.098	0.237	**0.574**

Extraction: Principal component analysis.

Conclusions. The research analysis provided a deeper understanding of consumers' cognition regarding green marketing factors in the context of green buildings. The 5 most important green marketing factors for consumers are:

1. Good natural ventilation in residences;
2. Abundant natural lighting in residences, reducing the electricity load of lighting;
3. Window shades included in residence designs, increasing air conditioning; efficiency and reducing electricity load;
4. The use of high-efficiency LED lighting in public spaces, reducing public electricity consumption;
5. Residential community developments consider the original terrain and water systems on site.

Based on the results of this study, we can infer that the green marketing factors most important to consumers can be categorized as physical environment, energy-saving equipment, water and soil preservation, and pollution prevention.

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