

Analyzing Key Success Factors of Green Brands for Enterprises in Taiwan

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During the last decade, environmental issues have become a global concern. According to a report by the Taiwan Environmental Protection Administration, more than 95% of consumers prioritize purchasing green products. Therefore, enterprises should consider environmental concerns in their operational strategies. This study identified how enterprises can successfully operate green brands, and focused on enterprises manufacturing daily necessities. Through a literature review, rules and an operational strategy were derived. Subsequently, 6 experts were interviewed and completed a questionnaire, then analytic hierarchy process was used to obtain the key success factors of green brands selling daily necessities. The resulting 10 key success factor findings provide a reference for enterprises seeking to act with social responsibility; develop high-quality green products, brands, and services; and protect the environment.

Keywords: analytic hierarchy process, green brands, key success factors

INTRODUCTION

In the past, when people purchased goods, price was the main concern; however, in recent years, because of the growing awareness of environmental matters, environmental protection has become crucial for both business operations and the public. Numerous customers have shown an increased preference for firms and products that are environmentally friendly, even if green products and services are more expensive (Manaktola & Jauhari, 2007; Mendleson & Polonsky, 1995; Vandermerwe & Oliff, 1990). In addition, the literature suggests that a brand perceived as green offers various benefits. Honkanen et al. (2006) reported that consumers are more willing to purchase brands that they hold positive feelings toward, such as environmentally friendly brands. Some consumers may use green

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products to demonstrate their environmentally conscious behavior (Hartmann & Apaolaza-Ibáñez, 2012). Consumers were found to be willing to pay a premium for green brands (Shrum et al., 1995), and it has been suggested that green brands may hold a competitive advantage over non-green rivals (Vandermerwe & Oliff, 1990; Gordon, 2002). Scarlett (1991) calculated that the current total global “green consumption” has reached US\$250 billion. According to a Boston Consulting Group report, more than 90% of European consumers had purchased environmentally friendly goods, and planned to continue frequently or occasionally making such purchases in the future. The “green consumption” concept is popular worldwide. According to a report by the Taiwan Environmental Protection Administration (EPA), 97% of consumers prioritize purchasing green products (Hsieh, 2010). Green consumption has entered the mainstream in the twenty-first century, and to establish a strong green image, enterprises have begun adopting various types of marketing strategies promoting their products or services as simultaneously improving consumers’ quality of life and the environment. Marketers aim to enhance the environmental value of products or services in the eyes of consumers, enhance their educational functions, and highlight the difference between green and non-green actions (Polonsky, 2011). Therefore, shaping the relationship between enterprise management and consumers is key to successfully marketing a green brand; this relationship is depicted Figure 1. In addition, some studies have received increased consumer identity, even though corporate social responsibility (CSR) is regarded as a new competition strategy. Studies have mentioned that CSR benefits both the public and the enterprises practicing it. When consumers view the public as benefiting from activities by an enterprise, they identify that enterprise as possessing social ethics and conscience, which result in a good impression. Effectively implementing a CSR strategy and cautiously designing image congruence between CSR and an enterprise can yield great benefits for the enterprise, and aid in maintaining a long-term relationship with consumers (Tseng & Chen, 2005). This study identified the key success factors for enterprises, which can serve as a reference for other enterprises seeking to develop green brands. It is hoped that this paper can be used as a benchmark and set of guidelines for such enterprises. In addition to general green transformation, enterprises could consider more effectively fulfilling their environmental responsibility to society, reducing the negative impact caused to the environment during production, elevating corporate brand image, and enhancing competitive advantages. It is hoped that brands in Taiwan recognize the concept and potential benefits of transforming into a green enterprise and thus contribute to the improvement of the global environment. There are abundant studies on key success factors. Leidecker and Bruno (1984) proposed that key success factors can be identified using eight analytical methods, including analyzing the environment, industrial structure, and industry, and interviewing experts. They also integrated the concept of Hofer and Schendel (1978), and combined the analytic hierarchy of key success factors with the formation process

State of the literature

- Enterprises should focus on green environmental issues in their operational strategies.
- Doing so could increase marketing competitiveness and consumer identity.
- The 10 key success factors from research finding provides further insight and a reference for enterprises to meet with social responsibility, developing high-quality green products, brands and services.

Contribution of this paper to the literature

- This study encourages more enterprises to join the group of green brands in Taiwan.
- The study summarizes the character of the strategies for promoting green brands and the difference of green strategies between each kind of enterprises.
- The 10 key success factors from research finding provides further insight and a reference for enterprises to meet with social responsibility, developing high-quality green products, brands and services.

concept, which is displayed in the relation of strategic planning. Figure 2 presents the relationship between the analysis hierarchy and strategic formation process.

The aims of this study were as follows:

1. Discuss enterprises in Taiwan and abroad that have been empirically shown as having executed successful green branding.
2. Summarize the evaluation indices of operational strategies for corporate operation of green brands, according to expert opinions and the literature.
3. Identify the key success factors for enterprises manufacturing daily necessities to operate green brands.

Research scope

Since 2010, Taiwanese magazine Business Next has conducted the Green Brand Survey, which identifies which brands are viewed by consumers as being the most environmentally conscious. Among the top 30 green brands during 4 years, 20 are foreign-owned, indicating that the performance of local brands in Taiwan may be

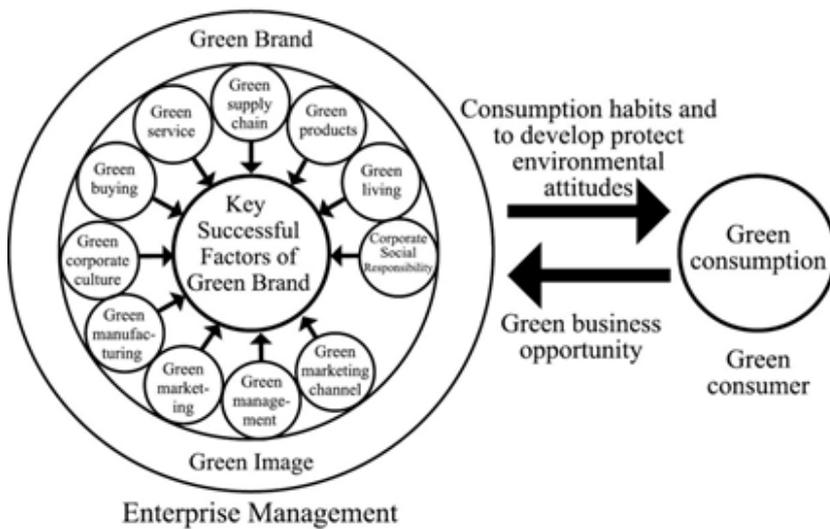


Figure 1. Relationship between green brands business and consumers

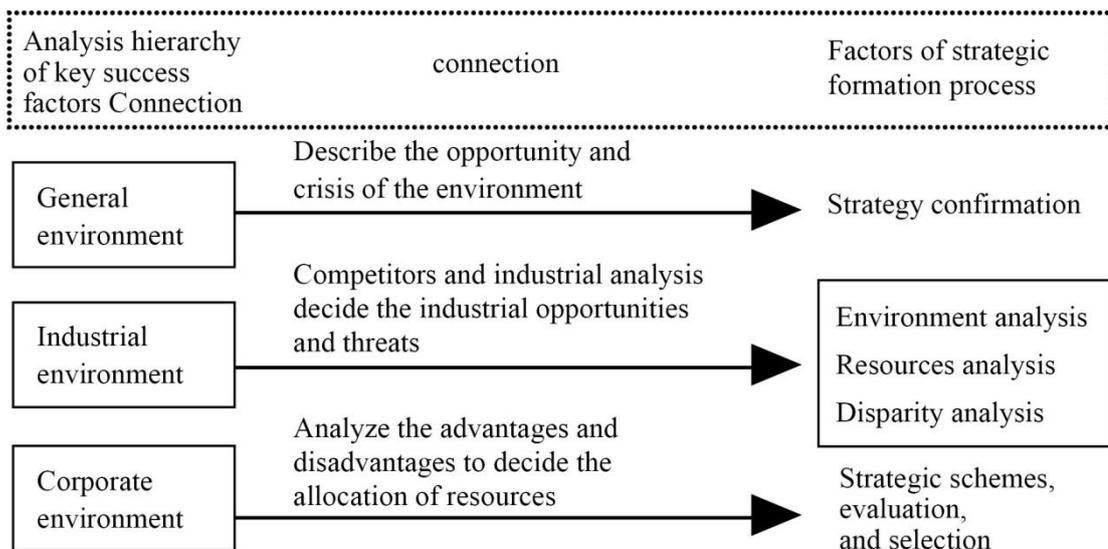


Figure 2. Relationship between the analysis hierarchy of key success factors and strategic formation process. (Leidecker and Bruno, 1984)

inferior to that of foreign brands with regard to green branding. This demonstrates that enterprises in Taiwan are not mature enough to cultivate themselves as or manage green brands. Hence, to determine how Taiwanese enterprises can develop into globally competitive green brands, this study selected representative green brands from four rounds of the Green Brand Survey (i.e., 2010–2013), and identified their key success factors, which can be used for self-evaluation by enterprises intending to develop green brands. All enterprises, irrespective of corporate scale and whether in the manufacturing or service industry should mitigate the burden they place on the environment. Digital Times magazine surveyed 10 industries and found that green enterprise strategy proposals differed among them. The scope of the current study was limited to enterprises manufacturing daily necessities because the green behavior of such enterprises can be assumed to have the most direct impact on the general public, and because this topic has been overlooked by previous studies. As a result of the erroneous belief that the production processes of daily necessities are simple, insufficient care has been focused on this area. In addition, the accumulating effect of manufacturing such products may be severe because the quantity of daily necessities that pass the scrutiny of ecolabeling by the EPA is smaller than that of other types of products, as detailed in Table 1. Hence, daily necessity manufacturing was selected as the research topic. The object of study was green brand operators (enterprise personnel) as well as experts and scholars specializing in environmental issues.

METHODS

Research framework

The research methods used to identify key success factors for enterprises developing green brands vary because the topic comprises different fields. Thus, there are multiple means of identifying key success factors; qualitative research, expert interviews, quantitative descriptive statistics, and factor analysis can be employed. A review of the literature from Taiwan and abroad on key success factors revealed that the most commonly used evaluation methods are case studies, the Delphi method, regression analysis, factor analysis, and the analytic hierarchy process (AHP). This study analyzed the literature on green brands and consumption, corporate greening, key success factors, and green brand survey activities, identified the hierarchal structure of studies examining corporate greening, conducted a research survey through expert interviews, and then proposed structural amendments according to the obtained opinions. Subsequently, through an expert

Table 1. Ecolabeling scrutiny

Product category	Scrutiny number	Effective number
Resource recovery products	531	158
Cleaning products	131	45
3C product category	4514	2682
Household electrical appliances category	1401	373
Save water products	500	105
Save energy products	272	158
Office appliances product	70	28
Resolvable product	76	4
Organic materials	147	70
Construction materials	617	320
Daily necessities	340	153
Industrial category	51	29
Utilize solar resources	59	48
Service category	3	1
Total	8712	4174

questionnaire survey and AHP, this study obtained weightings for strategic evaluation indices regarding green brands. The study then summarized the key success factors for daily necessity manufactures seeking to operate a green brand.

Research object

Because the concept of green brands is not popular in Taiwan, the current trends and situations of green brands in Taiwan must be determined to allow the identification of more precise key success factors. Therefore, the current research subjects included experts and scholars of sustainable operations, industrial experts of award-winning green brands, and the editors of a green brand survey. In-depth interviews on the same topic were conducted from different angles, and the professional knowledge and experience gained was used to create a key summary of observations and recommendations. The research objects were as follows:

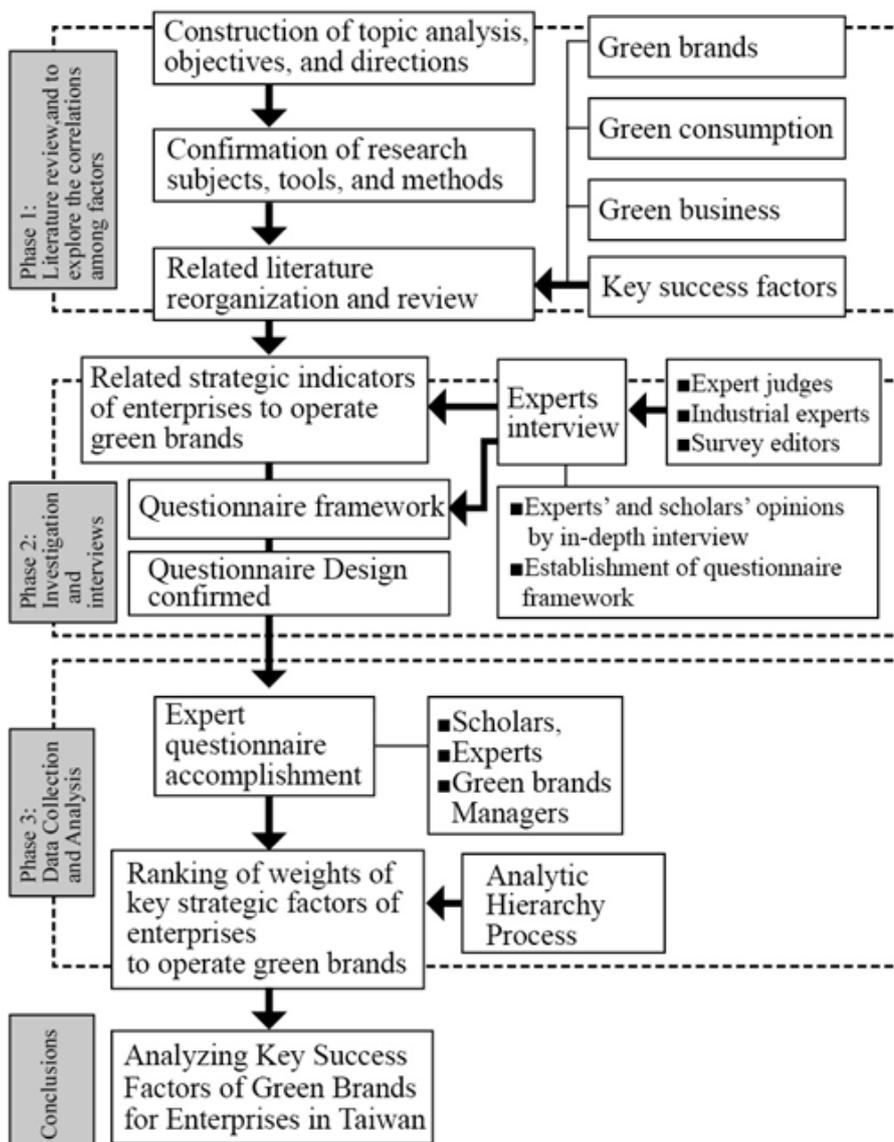


Figure 3. Research framework

Table 2. Green brands selected over 4 years in the daily necessities category of the Green Brand Survey

Industry Category	Brands name	Selected times
Daily necessities	Dandelion green household paper	3
	IKEA	1
	Burt's Bees	1
	Order	2
	Sujay	2
	P&G	2
	ARENA	1
	O`right	1
	3M	1
	The Body Shop	1
	AVEDA	1
	CHAMPION Construction materials	1
	DA.AI	1

1. The research objects of Part 1 Green Brand Survey by Business Next were experts who have acted as expert jury members, and acted as the interview experts of this study.
2. The research objects of Part 2 are the three top-performing green brands (Teyou, Youxuan, and Jiazuo) in the Green Brand Survey in the daily necessities category in the past 4 years. These objects were selected with the aim of further understanding and absorbing experience from these successful cases and thus identifying and enhancing the validity of this research. As indicated in Table 2, a total of 13 brands were examined.
3. The research objects in Part 3 were the editors and journalists responsible for conducting the Green Brand Survey. The information obtained from these experts was used to identify the factors considered when selecting the brands to be ranked highest in the survey.

Research design

The operation of green brands must consider various dimensions, including raw materials, manufacturing, sales, internal corporate culture, and product marketing. Although these dimensions are broad, the influential factors are relatively more, the choices and influential factors are numerous, and correct decisions cannot be made according to simple analysis and experience; thus, caution must be employed in decision making.

Phase1

According to the literature, to explore the correlations factors, strategic evaluation indicators, and green brands, the proposed strategic framework indicators of the AHP and the proposed architecture for consulting the experts were evaluated. Table 3 shows the preliminary AHP strategic evaluation indicator index.

Phase2

In-depth interviews were conducted with experts to obtain professional knowledge and experience regarding green brands. This information was used to recheck an expert questionnaire, and a hierarchical of questionnaire structure was confirmed. After the experts completed the questionnaire, numerous key success factors were identified and categorized into various areas. Reviewing the literature revealed that numerous research methods were available for this study, including the evaluation method (which is more common for application in case studies), the Delphi method, regression analysis, factor analysis, and the AHP. According to questionnaire results and expert evaluations of the relative importance of factors at the same level of strategic evaluation indicator index, the AHP can be used to conduct pairwise comparison. By analyzing the opinions of experts and scholars, the

Table 3. Preliminary AHP strategic evaluation indicator index

Goals of factors (The second level)	Literature source	Strategic evaluation indicator index	Literature source
Green products	Nonaka & Yamanouchi(1989), Chu,C.C. (2008), Kuo (2011)	Evaluation of life cycle	Sarkis (1995), Green Management Group, China Productivity Center (1996), Green Corporate Environmental Action Guide (2000), Hsieh (2008)
		Reducing or eliminating packaging	Kuo (2011), Chu (2012)
		Recyclable	Hsieh (2008), Chu (2012)
		Increasing product usability and life	Davis (1991), Hsieh (2008)
Green manufacturing	Nonaka & Yamanouchi(1989), Kuo (2011)	Easy disassembly and decomposition	Wen and Chen (1997)
		Reducing the use of raw materials and increasing the use of environmentally friendly raw materials	Davis (1991), Green Corporate Environmental Action Guide (2000), Hsieh (2008), Kuo (2011)
		Developing alternative or renewable energy sources	Kane (2011), Chu (2012)
		Improving energy and resource efficiency	Davis (1991), Green Corporate Environmental Action Guide (2000), Hsieh (2008), Daniel and Andrew (2009), Kuo (2011), Kane (2011)
		Preventing pollution	Davis (1991), Hsieh (2008), Kuo (2011), Kane (2011)
		Waste reduction and recycling	Green Corporate Environmental Action Guide (2000), Kuo (2011), Kane (2011)
Green Supply chain	Hsieh (2008), Gareth Kane(2011), Lin,C. I. & Hsien,C. F. (2013)	Carbon offsets	Kane (2011)
		Curbing greenhouse gas emissions	Hsieh (2008), Chu (2012)
		Reducing downstream costs	Daniel and Andrew (2009)
		Execution of green procurement	Hsieh (2008), Kane (2011)
		Planning green transport	Kane (2011)
		Industrial symbiosis	Tang (2000), Kane (2011)
Green management	Green Corporate Environmental Action Guide (2000), Chu,C.C. (2008), Daniel & Andrew(2009), Kuo (2011)	Environmental cooperation with upstream and downstream companies	Kuo (2011)
		Integrating suppliers into appraisal system	Green Management Group, China Productivity Center (1996), Lin and Hsien (2013)
		Establishing a correct concept of "Green branding"	Green Management Group, China Productivity Center (1996), Chu (2008)
		Fostering a green business culture	Nonaka and Yamanouchi (1989), Tang (2000), Chu (2008), Hsieh (2008)
		Promoting higher-level managers	Nonaka and Yamanouchi (1989), Hsieh (2008)
		Training and educating employees	Chu (2008), Hsieh (2008)
		Establishing green institutions	Nonaka and Yamanouchi (1989), Chu (2008)
		Developing environmental management systems and monitoring	Nonaka and Yamanouchi (1989), Green Management Group, China Productivity Center (1996), Tang (2000), Green Corporate Environmental Action Guide (2000), Chu (2008), Kuo (2011), Chu (2012)
Green marketing	Hsieh (2008), Chu,C.C. (2008), Daniel & Andrew(2009), Kuo (2011)	Striving for Green Mark certification abroad	Green Management Group, China Productivity Center (1996), Kuo (2011), Lin and Hsien (2013)
		Constructing green factories	Chu (2008), Kuo (2011), Kane (2011), Chu (2012), Lin and Hsien (2013)
		Developing product service systems	Kane (2011)
		Developing new brand images for enterprises	Chu (2008)
		Social welfare activities	Chu (2008), Lin and Hsien (2013)
		Establishing a desirable corporate reputation and brand trust	Daniel and Andrew (2009)
		Reducing the information gap between businesses and consumers	Nakano (2012)
		Communicating with stakeholders	Nonaka and Yamanouchi (1989), Green Corporate Environmental Action Guide (2000)
Green marketing	Hsieh (2008), Chu,C.C. (2008), Daniel & Andrew(2009), Kuo (2011)	Information transparency and openness	Green Management Group, China Productivity Center (1996)
		Public environmental report of enterprises	Chu (2012)

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views differ, the evaluation results can be generalized using the geometric mean.

Phase 3. Overview and applications

Numerous factors determine the success of green brands; therefore, simple analysis and experience cannot be relied upon to succeed in the marketing of green brands. This study employed the flexible and powerful tool referred to as analytic hierarchy process (AHP), in which the scores and subsequent final rankings are based on the pairwise relative evaluations of the criteria as well as the options provided by users. AHP enables the easy detection of inconsistencies in responses and in the reliability of measurements (Czaja, Schulz, Lee, & Belle, 2003). The computations made by AHP are guided by the experience of the decision-maker, which enables AHP to translate the evaluations (both qualitative and quantitative) made by the decision-maker into multicriteria rankings. AHP is easy to use because it avoids the need to build a complex expert system embedded with the decision-maker’s knowledge (Saaty, 1980). This makes AHP an effective and robust technique for addressing complex problems through decomposition and synthesis based on hierarchical levels (Cui et al., 2011). This approach makes it possible to consider the views of numerous experts and decision-makers on a variety of topics. AHP has been used in various decision-making scenarios: British Airways used it in 1998 for the selection of an entertainment system vendor for its entire fleet of airplanes. In 1999, the Ford Motor Company used AHP to identify priorities in seeking to improve customer satisfaction, which ultimately earned them an Award for Excellence for the success in dealing with clients (Saaty, 2008).

This study employed the analysis software Yaahp for the construction of AHP equations for the establishment of priorities and weights to identify the key success factors of green brands. This phase comprises six steps:

Step 1. Identify factors of performance. These key success factors were determined through a comprehensive review of related literature. Table 3 presents the preliminary AHP strategic evaluation indicator index.

Step 2. Structure the decision hierarchy by inviting experts to define critical factors for the preliminary questionnaire.

Step 3. Construct matrices for the calculation of a set of pairwise comparisons and construct pairwise comparison matrices based on the suggestions of a panel of experts. Linguistic variables are often used as inputs for these matrices. An example is given in Equation (1).

$$[A]=[a_{ij}]=\begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ 1/a_{12} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/a_{1n} & 1/a_{2n} & \cdots & 1 \end{bmatrix} \tag{1}$$

Step 4. Calculate the relative weights of the factors for each level using Equation (2).

$$W_i = \frac{\sqrt[n]{\left(\prod_{j=1}^n a_{ij}\right)}}{\sum_{i=1}^n \sqrt[n]{\left(\prod_{j=1}^n a_{ij}\right)}}, i, j=1, 2, \dots, n. \quad (2)$$

We multiply priority vector W_i with an even ratio of matrix A in order to obtain a new priority vector W'_i , as shown in Equation (3). Each of the values is divided by the value corresponding to each of the original vector W_i . Finally, using the arithmetic mean, we can obtain the maximum eigenvalue λ_{\max} , as shown in Equation (4).

$$W'_i = A \times W_i = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ 1/a_{12} & 1 & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/a_{1n} & 1/a_{2n} & \dots & 1 \end{bmatrix} \times \begin{bmatrix} W_1 \\ W_2 \\ \vdots \\ W_n \end{bmatrix} = \begin{bmatrix} W'_1 \\ W'_2 \\ \vdots \\ W'_n \end{bmatrix} \quad (3)$$

$$\lambda_{\max} = \frac{1}{n} \left(\frac{W'_1}{W_1} + \frac{W'_2}{W_2} + \dots + \frac{W'_n}{W_n} \right) \quad (4)$$

Step 5. Check and balance the decisions.

In the phase, we check to determine whether the results are compatible with our expectations. In the event that flaws are identified, a review of the previous process is required. Whenever necessary, the model should be complemented by the inclusion of elements or criteria not previously identified or considered (Rosaria, 2015). Part of this checking process involves ensuring that the experts were consistent in their evaluation of the factors. For this we use the consistency index (CI) developed by Saaty (2008). This is given in Equation (5).

$$C.I. = \frac{\lambda_{\max} - n}{n-1} \quad (5)$$

More complex problems increase the number of factors to be compared, such that consistency becomes even increasingly difficult to maintain. Saaty (2008) introduced a consistency ratio (CR), wherein a $CR \leq 0.1$ is considered to be of an acceptable level. CR is then calculated using Equation (6).

$$C.R. = \frac{C.I.}{R.I.} \quad (6)$$

Step 6. Document the decision. The resulting weighted rankings allow for the identification of key success factors of green brands.

RESULTS AND DISCUSSION

This study constructed a hierarchical analysis model of the key success factors for green brand operation among manufacturers of daily necessities and of the correlation between the levels. Through expert interviews and a literature review, the study generalized the strategic indicators of enterprises' operation of green brands and used these to design an expert questionnaire. Questionnaires were distributed to the top-performing enterprises in the Green Brand Survey. The questionnaire responses were used to determine the key success factors through the AHP, and thus establish a process and checklist for daily necessity manufacturers seeking to develop green brands.

Expert interview content

Six experts were interviewed for this study. The subjects were the expert judges for the Business Next Green Brand Survey, as well as the editors and journalists of that magazine and the enterprises with the highest performance according to the survey. They were all experts with professional experience related to green business, thus could propose options of key factors for green brands. Table 4 provides a summary of the background of each expert.

After the experts completed the questionnaire, a hierarchical structure was constructed. Numerous key success factors were identified and categorized into

various areas. AHP hierarchical structure before and after modification, show as in Table 5.

Construction of AHP hierarchical dimensions and evaluation indicators

By analyzing the information obtained in the expert interviews, this study identified five Goals of factors objective dimensions, namely green products, green manufacturing, green supply chain, green management, and green marketing, and 25 strategic evaluation indicators for developing the expert questionnaire, as depicted in Figure 4.

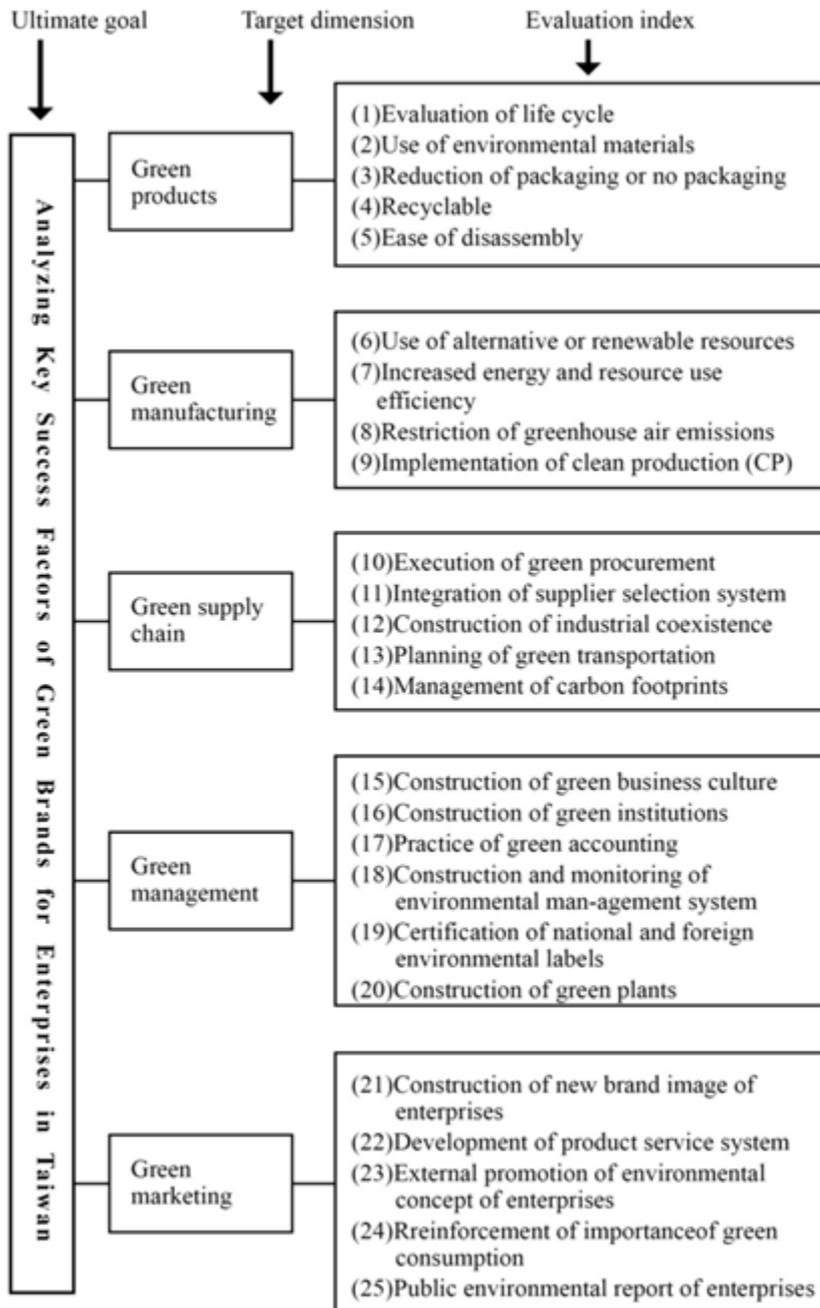


Figure 4. Strategic index evaluation analysis of the green brand operation of enterprises presented in an AHP structure graph

Table 4. Expert backgrounds

Expert	interviewee	Affiliation	Professional field
1	Professor Hsien-Lun, Hu	Institute of Environmental Engineering and Management, National Taipei University of Technology	Life cycle evaluation Information disclosure and environment report Product design for environment Environment management strategy Clean product and manufacturing process
2	Assistant Manager Yu-cheng, Chang	Taiwan Green Productivity Foundation	Environment management system /Life cycle appraisal Energy management system/Corporate social responsibilities
3	Project assistant manager Chi-huan, Lin	TUV Rheinland Taiwan Ltd.	Green products and energy management system Plant and product inspection /Response planning of green norms
4	Sustainability Team Leader / Jia-yuan, Zhang	Plastic Industry Development Center	Green supply chain guidance for small and medium-sized enterprises Environment quality management coaching Industry low-carbon plan
5	Journalist Jian-hong, liu	<i>Business Next</i> Media Group— <i>Business NextMagazine</i>	The green industry-related interviews and reports
6	Research department Yi-rong, Chen	DA.AI Technology coexist with the Earth	Green supply chain coaching for small and medium-sized enterprises Environment quality management coaching / Industry low-carbon plan

Table 5. AHP hierarchical structure before and after modification

Goals of factors	Goals of factors before interview	Goals of factors after interview
Green products	<ul style="list-style-type: none"> ■ Evaluation of life cycle ■ Reducing or eliminating packaging ■ Recyclable ■ Increasing product usability and life ■ Easy disassembly and decomposition 	<ul style="list-style-type: none"> ■ Evaluation of life cycle ■ Use of environmental materials ■ Reduction of packaging or no packaging ■ Recyclable ■ Ease of disassembly
Green manufacturing	<ul style="list-style-type: none"> ■ Reducing the use of raw materials, and increasing the use of environmentally friendly raw materials ■ Developing alternative or renewable energy sources ■ Improving energy and resource efficiency ■ Preventing pollution ■ Waste reduction and recycling ■ Carbon offsets ■ Curbing greenhouse gas emissions 	<ul style="list-style-type: none"> ■ Use of alternative or renewable resources ■ Increased energy and resource use efficiency ■ Restriction of greenhouse air emissions ■ Implementation of clean production (CP)
Green Supply chain	<ul style="list-style-type: none"> ■ Reducing downstream costs ■ Executing green procurement ■ Planning green transport ■ Industrial symbiosis ■ Environmental cooperation with upstream and downstream companies ■ Integrating suppliers into appraisal system 	<ul style="list-style-type: none"> ■ Execution of green procurement ■ Integration of supplier selection system ■ Construction of industrial coexistence ■ Planning of green transportation ■ Management of carbon footprints
Green management	<ul style="list-style-type: none"> ■ Establishing a correct concept of “green branding” ■ Fostering a green business culture ■ Promoting higher-level managers ■ Training and educating employees ■ Establishing green institutions ■ Developing environmental management systems and monitoring ■ Striving for Green Mark certification abroad ■ Constructing green factories 	<ul style="list-style-type: none"> ■ Construction of green business culture ■ Construction of green institutions ■ Practice of green accounting ■ Construction and monitoring of environmental management system ■ Certification of national and foreign environmental labels ■ Construction of green plants
Green marketing	<ul style="list-style-type: none"> ■ Developing product service systems ■ Developing new brand images for enterprises ■ Social welfare activities ■ Establishing a desirable corporate reputation and brand trust ■ Reducing the information gap between businesses and consumers ■ Communicating with stakeholders ■ Information transparency and openness ■ Public environmental report of enterprises 	<ul style="list-style-type: none"> ■ Construction of new brands image of enterprises ■ Development of product service system ■ External promotion of environmental concept of enterprises ■ Reinforcement of importance of green consumption ■ Public environmental report of enterprises

Table 6. Release and recovery of questionnaires

Respondents	Number of sent copies	Number of recovered copies	Recovery rate	Effective copies	Effective recovery rate (%)
Scholars and experts	13	9	69%	8	89%
Green brands operators	11	6	55%	4	67%
Total	24	15	63%	12	80%

Table 7. Overall analysis results of scholars and experts

Goals of factors (The second level)	Hierarchical weight	Rank	Evaluation indicators (The third level) (Evaluation index)	Hierarchical weight	Hierarchical ranking	Total weight	Total ranking
A : Green products	0.2118	2	A1 : Evaluation of life cycle	0.2020	2	0.0428	10
			A2 : Use of environmental materials	0.4103	1	0.0869	1
			A3 : Reduction of packaging or no packaging	0.1299	4	0.0275	17
			A4 : Recyclable	0.1702	3	0.036	12
			A5 : Ease of disassembly	0.0876	5	0.0186	23
B : Green Manufacturing	0.1101	5	B1 : Use of alternative or renewable resources	0.1593	4	0.0175	24
			B2 : Increased energy and resource use efficiency	0.2792	2	0.0307	14
			B3 : Restriction of greenhouse air emissions	0.1698	3	0.0187	22
			B4 : Implementation of clean production (CP)	0.3917	1	0.0431	9
C : Green Supply chain	0.1695	3	C1 : Execution of green procurement	0.3114	1	0.0528	6
			C2 : Integration of supplier selection system	0.2803	2	0.0475	8
			C3 : Construction of industrial coexistence	0.1839	3	0.0312	13
			C4 : Planning of green transportation	0.0953	5	0.0162	25
			C5 : Management of carbon footprints	0.1292	4	0.0219	20
D : Green management	0.3647	1	D1 : Construction of green business culture	0.2019	3	0.0736	4
			D2 : Construction of green institutions	0.1346	5	0.0491	7
			D3 : Practice of green accounting	0.0589	6	0.0215	21
			D4 : Construction and monitoring of environmental management system	0.2371	1	0.0865	2
			D5 : Certification of national and foreign environmental labels	0.1603	4	0.0585	5
			D6 : Construction of green plants	0.2072	2	0.0756	3
E : Green marketing	0.1438	4	E1 : Construction of new brands image of enterprises	0.2134	2	0.0307	14
			E2 : Development of product service system	0.1716	4	0.0247	18
			E3 : External promotion of environmental concept of enterprises	0.167	5	0.024	19
			E4 : Reinforcement of importance of green consumption	0.197	3	0.0283	16
			E5 : Public environmental report of enterprises	0.2511	1	0.0361	11

Questionnaire analysis

Questionnaire collection

A total of 24 questionnaires were delivered to scholars, experts, and green brand operators. A total of 15 completed questionnaires were returned, for a recovery rate of 63%. Of the returned questionnaires, 12 were valid, for an effective recovery rate of 80%. Table 6 summarizes the release and recovery data of the questionnaires.

Weight analysis of dimensions evaluated by scholars and experts

Weight analysis was conducted on the target dimensions and evaluation guidelines of the eight effective scholar and expert questionnaires. Table 7 summarizes the analysis results of each dimension. The results revealed that most of the top 10 evaluation indices belonged to the green management dimension, suggesting the importance of green management in the operation of green brands. "Formulation of environment management system and supervision" (relative weight value = 0.0865) was the second highest index. The top green products index was "use of environmentally friendly materials" (relative weight value = 0.0869).

Of the top 10 evaluation indices, two were from the green products dimension; one was from the green processing dimension; two were from the green supply chain dimension; and the remaining five were from the green management dimension. These results indicated that the experts believed green management to be the most crucial dimension. No index from the green marketing dimension was among the top 10 indicators.

Table 8. Overall analysis results of green brand operators

Goals of factors (The second level)	Hierarchical weight	Rank	Evaluation indicators (The third level) (Evaluation index)	Hierarchical weight	Hierarchical ranking	Total weight	Total ranking
A : Green products	0.3630	1	A1 : Evaluation of life cycle	0.1012	4	0.0367	7
			A2 : Use of environmental materials	0.4882	1	0.1772	1
			A3 : Reduction of packaging or no packaging	0.183	2	0.0664	4
			A4 : Recyclable	0.1439	3	0.0522	6
			A5 : Ease of disassembly	0.0837	5	0.0304	14
B : Green Manufacturing	0.1983	3	B1 : Use of alternative or renewable resources	0.4006	1	0.0794	3
			B2 : Increased energy and resource use efficiency	0.2679	2	0.0531	5
			B3 : Restriction of greenhouse air emissions	0.1491	4	0.0296	16
			B4 : Implementation of clean production (CP)	0.1823	3	0.0362	10
C : Green supply chain	0.0833	5	C1 : Execution of green procurement	0.3398	1	0.0283	17
			C2 : Integration of supplier selection system	0.1346	5	0.0112	24
			C3 : Construction of industrial coexistence	0.1864	3	0.0155	22
			C4 : Planning of green transportation	0.144	4	0.012	23
			C5 : Management of carbon footprints	0.1953	2	0.0163	20

D : Green Management	0.2489	2	D1 : Construction of green business culture	0.3258	1	0.0811	2
			D2 : Construction of green institutions	0.1335	5	0.0332	13
			D3 : Practice of green accounting	0.1393	3	0.0347	11
			D4 : Construction and monitoring of environmental management system	0.1345	4	0.0335	12
			D5 : Certification of national and foreign environmental labels	0.1201	6	0.0299	15
			D6 : Construction of green plants	0.1469	2	0.0366	8
E : Green marketing	0.1065	4	E1 : Construction of new brands image of enterprises	0.3417	1	0.0364	9
			E2 : Development of product service system	0.0832	5	0.0089	25
			E3 : External promotion of environmental concept of enterprises	0.1851	3	0.0197	19
			E4 : Reinforcement of importance of green consumption	0.2365	2	0.0252	18
			E5 : Public environmental report of enterprises	0.2511	1	0.0361	11

Weight analysis of dimensions evaluated by green brand operators

According to Table 8, green brand operators tended to emphasize the green products and green processing dimensions. This result may be because green brand operators have more real-world experience dealing with consumer markets and products, and thus pay particular attention to the greening of products and processing and less to concerns related to green supply chain and green marketing.

Among the top 10 indicators, four were from the green products dimension, which, as in the expert questionnaires, was considered the most crucial target dimension; three were from the green processing dimension; two were from the green management dimension; one was from the green marketing dimension; and no indicators were from the green supply chain dimension, which was also regarded as the least crucial dimension by the experts.

Comparative analysis of overall evaluation

The top 10 overall indices according to both questionnaire groups are highlighted in green in Table 9. The table 9 demonstrates that the dimensions emphasized by the scholars and experts differed from those identified by the green brand operators as being most crucial. Five of the top 10 factors identified by the experts were related to green management, which shows that the scholars and experts highlighted this dimension; by contrast, the green brand operators placed more emphasis on green products and processing. The ideas of the scholars and experts tended to be ideal. It can be seen that a disparity existed between actual performance and idealized performance.

Table 9. Comparative analysis of overall evaluations of expert and green brand operator group

Goals of factors (The second level)	Evaluation indicators (The third level) (Evaluation index)	Scholars and Experts		Green brands operators	
		Hierarchical weight	Ranking	Hierarchical weight	Ranking
A : Green products	A1 : Evaluation of life cycle	0.0428	10	0.0367	7
	A2 : Use of environmental materials	0.0869	1	0.1772	1
	A3 : Reduction of packaging or no packaging	0.0275	17	0.0664	4
	A4 : Recyclable	0.0360	12	0.0522	6
	A5 : Ease of disassembly	0.0186	23	0.0304	14
B : Green manufacturing	B1 : Use of alternative or renewable resources	0.0175	24	0.0794	3
	B2 : Increased energy and resource use efficiency	0.0307	14	0.0531	5
	B3 : Restriction of greenhouse air emissions	0.0187	22	0.0296	16
	B4 : Implementation of clean production (CP)	0.0431	9	0.0362	10
C : Green supply chain	C1 : Execution of green procurement	0.0528	6	0.0283	17
	C2 : Integration of supplier selection system	0.0475	8	0.0112	24
	C3 : Construction of industrial coexistence	0.0312	13	0.0155	22
	C4 : Planning of green transportation	0.0162	25	0.0120	23
	C5 : Management of carbon footprints	0.0219	20	0.0163	20
D : Green management	D1 : Construction of green business culture	0.0736	4	0.0811	2
	D2 : Construction of green institutions	0.0491	7	0.0332	13
	D3 : Practice of green accounting	0.0215	21	0.0347	11
	D4 : Construction and monitoring of environmental management system	0.0865	2	0.0335	12
	D5 : Certification of national and foreign environmental labels	0.0585	5	0.0299	15
	D6 : Construction of green plants	0.0756	3	0.0366	8
E : Green marketing	E1 : Construction of new brands image of enterprises	0.0307	14	0.0364	9
	E2 : Development of product service system	0.0247	18	0.0089	25
	E3 : External promotion of environmental concept of enterprises	0.0240	19	0.0197	19
	E4 : Reinforcement of importance of green consumption	0.0283	16	0.0252	18
	E5 : Public environmental report of enterprises	0.0361	11	0.0361	20

Although the opinions of the two groups differ, the ideas and knowledge of both could supplement each other from different perspectives and thus be used to form more effective operation strategies.

In addition, both the top 10 indices of the two questionnaire groups included "life cycle evaluation," "use of environmentally friendly materials," "promotion of clean production," "establishment of green corporate culture," and "establishment of

green plants,” among which “use of environmentally friendly materials” was the highest weighted by both groups.

In discussing management information crises, Daniel (1961) mentioned that “most industries have 3 to 6 key success factors”; however, recent studies have identified between 5 and 10 such factors. Thus, this study selected the top 10 influential factors from among 25 strategic evaluation indices as the key success factors for the operation of green brands by daily necessities manufacturers, as listed in Table 10. These top 10 strategic evaluation indices were selected according to the analysis results of the overall expert evaluation, and were as follows:

- 1) “Use of environmental materials” (overall weight value = 0.1298);
- 2) “Construction of green business culture” (overall weight value = 0.0820);
- 3) “Construction and monitoring of environmental management system” overall weight value = 0.0571);
- 4) “Construction of green plants” (overall weight value = 0.0558);
- 5) “Recyclable” (overall weight value = 0.0454);
- 6) “Reduction of packaging or no packaging” (overall weight value = 0.0447);
- 7) “Certification of national and foreign environmental labels” (overall weight value = 0.0444);
- 8) “Increased energy and resource use efficiency” (overall weight value = 0.0438);
- 9 and 10) “Implementation of clean production (CP)” and “Construction of green institutions” (overall weight value of both = 0.0428).

Table 10. Overall weighted order of key success factors

Ranking	Strategic evaluation indices	Hierarchical weight
1	A2 : Use of environmental materials	0.1298
2	D1 : Construction of green business culture	0.0820
3	D4 : Construction and monitoring of environmental management system	0.0571
4	D6 : Construction of green plants	0.0558
5	A4 : Recyclable	0.0454
6	A3 : Reduction of packaging or no packaging	0.0447
7	D5 : Certification of national and foreign environmental labels	0.0444
8	B2 : Increased energy and resource use efficiency	0.0438
9	B4 : Implementation of clean production (CP)	0.0428
9	D2 : Construction of green institutions	0.0428

CONCLUSION

This study identified the key success factors for the operation of green brands by enterprises that manufacture daily necessities. By using analysis tools and AHP software, the weight priorities of the strategic evaluation indices were effectively identified.

The current findings can guide enterprises in establishing and operating green brands. The conclusions of this study are as follows.

In the literature review, a lot of global brands were used to identify the benefits to enterprises of operating a green brand, namely environmental friendliness and cost reduction. Green products and services are designed to meet customer demand, stimulate growth, and increase the loyalty and brand trust of customers, thus creating a situation that is mutually beneficial for consumers and enterprises. Some strategic evaluation indices are summarized in the evaluation structure.

In this study, five targeted dimensions were identified in the evaluation dimensions of green brand operation by daily necessity manufacturers, namely green products, green processing, green supply chain, green management, and green

marketing. The strategic evaluation indices of a total of 25 dimensions are as follows:

1. Green product dimension
(1) life cycle evaluation, (2) use of environmentally materials, (3) reduction of packaging or no packaging, (4) recyclable, (5) ease of disassembly.
2. Green processing dimension
(6) use of alternative or recyclable energy and resources, (7) increased energy and resource use efficiency, (8) restriction of greenhouse air emissions, (9) Implementation of clean production (CP)
3. Green supply chain dimension
(10) execution of green procurement, (11) integration of supplier selection system, (12) construction of industrial coexistence, (13) planning green transportation, (14) management of carbon footprint.
4. Green management dimension
(15) construction of green business culture, (16) construction of green institutions, (17) practice of green accounting, (18) construction and monitoring of environmental management system, (19) certification of national and foreign environmental labels, and (20) construction of green plants.
5. Green marketing dimension
(21) construction of new brands image of enterprises, (22) development of product service system, (23) external promotion of environmental concept of enterprises, (24) reinforcement of importance of green consumption, and (25) public environmental report of enterprises.

According to the collected and analyzed data, to identify the key success factors, this study selected the top 10 indices as indicated by the overall evaluation results of all experts, which, in order of weight, are as follows:

- (1) Use of environmental materials
- (2) Construction of green business culture
- (3) Construction and monitoring of environmental management system
- (4) Construction of green plants
- (5) Recyclable
- (6) Reduction of packaging or no packaging
- (7) Certification of national and foreign environmental labels
- (8) Increased energy and resource use efficiency
- (9) Implementation of clean production (CP)
- (10) Construction of green institutions

This study offers a basic foundation for green brand operation by daily necessity manufacturers, but there remains room for exploration. For example, future studies may compare domestic Taiwanese brands with overseas brands, or compare different industries and industry segments. The industrial samples of daily necessity enterprises examined in this study were derived from the Green Brand Survey, and many of the enterprises were overseas brands with subsidiaries in Taiwan, thus, information cannot be sufficiently disclosed.

This study examined only enterprises that manufacture daily necessities; however, key success factors may vary depending on the products and industry of enterprises. Hence, it is also a limitation of this study that it addressed only daily necessities and scholars and experts in a single field. Future studies could investigate and compare the key success factors of other enterprises in other product categories. Such findings could serve as a reference for enterprises intending to establish green brands and act with CSR, develop high-quality green products and services, and protect the environment.

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