Demographic Differences in Perception, Attitude, and Behavioral Intention toward Carbon-labeled Hotels*

인구통계학적 특성에 따른 탄소성적표지 인증호텔에 대한 지각, 태도 및 행동의도 차이

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Abstract : As the awareness of the seriousness of climate change has increased, carbon labeling has introduced as a meaningful instrument to motivate CO^2 emission reductions. Since the lodging industry contributes heavily to climate change with considerable CO^2 emission, it is required that hotel sector must participate in green management strategies by adopting carbon labels to reduce CO^2 emission. However, the achievement of carbon labeling is very low in the Korean hotel industry from the lack of understanding of consumers' responses to carbon label. Thus, the purpose of this research is to analyze the demographic differences in perception, attitude, and behavioral intention toward carbon labels in the hotel industry. The results indicate that there are significant differences in not only perception of carbon labels, but also attitude and behavioral intention toward carbon-labeled hotels according to demographic characteristics such as gender, age, marital status, presence of children, the level of education, and the level of income. Furthermore, this study proposes key implications for hotels' better green marketing strategies and directions for future research.

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국문요지 : 기후변화에 대한 심각성이 증가함에 따라 이산화탄소 배출을 감축하기 위해 탄소성적표지 인증제도가 도입되었다. 호텔산업은 상당한 양의 이산화탄소를 배출하기 때문에 탄소성적표지 인증제도를 통한 친환경경영에 대한 필요성이 제기되고 있다. 그러나 국내 호텔산업은 탄소성적표지에 대한 소비자들의 반응에 대한 이해부족으로 인해 탄소성적표지 취득이 저조한 실정이다. 따라서 본 연구의 목적은 소비자들의 인구통계학적 특성에 따른 탄소성적표지에 대한 지각, 탄소성적표지 인증호텔에 대한 태도 및 탄소성적표지 인증호텔에 대한 행동의도의 차이에 대해 연구하는 것이다. 분석결과 탄소성적표지에 대한 지각, 탄소성적표지 인증호텔에 대한 태도 및 탄소성적표지 인증호텔에 대한 행동의도는 성별, 연령, 결혼유무, 자녀유무, 교육수준, 소득수준 등과 같은 인구통계학적 특성에 따라 차이가 나타났다. 분석결과를 바탕으로 효과적인 친환경호텔 경영을 위한 마케팅 전략과 실무적 시사점이 논의되었다.

열쇠말 : 탄소성적표지, 탄소성적표지 인증호텔, 지각, 태도, 행동의도, 인구통계학적 특성

I. Introduction

Since climate change by increasing carbon dioxide(CO^2) emissions has been acknowledged as one of the most pressing environmental problems(de Koning, Schowanek, Dewaele, Weisbrod, & Guinée, 2010), carbon labeling has developed as a meaningful instrument to motivate CO^2 emission reductions(Liu, Wang, & Su, 2016). Carbon labeling is a useful tool to lead consumers into eco-friendly attitude and behavior(Hartikainen, Roininen, Katajajuuri, & Pulkkinen, 2014) through ensuring the environmental performance of the company and offering the corresponding information to the consumer(Ayuso, 2007).

Tourism sector is considered as a serious contributor of CO^2 emissions (UNWTO, UNEP, & WMO, 2008). The lodging industry in particular contributes heavily to climate change because considerable CO^2 is emitted by consumption of large quantities of energy such as water, electricity(Sloan, Legrand, Tooman, & Fendt, 2009). Thus, it is required that hotel sector must participate in green management strategies by adopting carbon labels to reduce CO^2 emission. Nevertheless, the achievement of carbon labeling is very low in the Korean hotel industry(KEITI, 2017) from the lack of understanding of consumers' responses to carbon label(Penny, 2007).

Carbon label can lead to the benefit of an image improvement of the hotel and cost savings(Ayuso, 2007). Furthermore, increasingly aware of the seriousness of climate change, eco-friendly consumers, who are seeking to purchase carbon-labeled products, have been growing(Zhao & Zhong, 2015). Environmentally friendly practices by adopting a carbon labels scheme can be an effective marketing strategy targeting eco-friendly consumers to achieve competitiveness in the lodging industry(Manaktola & Jauhari, 2007). Therefore, carbon label can help the hotel industry make higher profits through expansion of new target markets.

A important challenge facing hotel marketers is to understand which consumers positively perceive carbon labels, which consumers have favorable attitudes toward carbon-labeled hotels, and which consumers are willing to visit for carbon-labeled hotels. As the variables of perception, attitude, and behavioral intention related to carbon labels play an important role in the consumers' purchase decision-making

process(Lee & Kim, 2017), there is a rising desire for better understanding consumer's perception, attitude, and behavioral intention toward carbon labels in hotel industry(Hartikainen *et al*., 2014).

Although the majority of consumers generally have positive perception, attitude, and behavioral intention towards eco-labels such as carbon label(Gadema & Oglethorpe, 2011; Guenther, Saunders, & Tait, 2012), consumers' perception, attitude, and behavioral intention toward eco-labels that appears depends on the demographic characteristics(D'Souza, Taghian, Lamb, & Peretiatko, 2007; Ozanne, Humphrey, & Smith, 1999; Teisl, Rubin, & Noblet, 2008). Therefore, the profile of the segment of consumers according to demographic difference in perception, attitude, and behavioral intention toward carbon label would tremendously help hotel managers and marketers target the right people and plan their marketing strategies to effectively communicate with potential consumers(Hsu, Kang, & Wolfe, 2002). Moreover, analysis of demographic characteristics, which have long been utilized as the foundation of segmentation(Johns & Gyimóthy, 2002), can provide advantageous information regarding policy questions and market trend for macro marketing(D'Souza *et al*., 2007).

Thus, the purpose of this research is to analyze the demographic differences in perception, attitude, and behavioral intention toward carbon labels in the hotel industry. This study can help hotel operators and marketers understand consumers' response to carbon labels to formulate better green marketing strategies by adopting carbon labeling scheme. Hotel marketers will be able to elaborate strategies specifically targeted at the consumers that arise from an enhanced understanding of the profile of the segment of consumers.

II. Literature Review

1. Carbon label

Carbon label refers to the initiative to help consumers, who are concerned about climate change, purchase specific products or services(Brenton, Edwards-Jones, &

Jensen, 2009). Carbon labels have been implemented in numerous countries including South Korea, UK, France, Germany, and Japan to reduce CO^2 emissions by influencing consumer choices(Liu *et al.*, 2016). Carbon labels play a pivotal role in providing functional information in order to recognize companies' dedications to reducing CO^2 emission(Boardman, 2008) and enable consumers to choose more climatically sustainable products(Cohen, Higham, Peeters, & Gössling, 2014). Gössling and Buckley(2016) stressed that carbon labels have no substitute for climate policy because carbon labels can make a contribution to behavioral change.

Carbon labeling is the best vehicle for promoting and implementing environmental programs in hotels(Chan & Hawkins, 2012) since green practices using eco-labels such as carbon labels have played a critical role in operational planning and marketing in the hotel industry(Han, Hsu, Lee, & Sheu, 2011). Carbon-labeled hotels can save operational costs and gain competitive benefit through improving positive reputation and image(Chen, 2008) with enhancing consumer confidence in green products(Chan, 2013). For instance, Whitbread, which is one of the UK's largest hotel groups, has reduced costs and increased operating profits through carbon labeling programs (Carbon Trust, 2017).

2. Perception

Perception is defined as the cognitive process to understand the specific objects, people, symbols, or signs(Yusuf & Wiyana, 2015). Carbon labels can improve the marketing communication when carbon labels are perceived as important and credible by consumers(Gössling & Buckley, 2016). In terms of carbon label, credibility refers to an individual's judgment of the believability of carbon label(Appelman & Sundar, 2016) while importance can be defined as individual's judgment on the relative worth of carbon label(Bloch & Richins, 1983). The credibility of the carbon labels can be established through perceived consumer effectiveness, knowledge on the label, familiarity with the label, and the third-party verification of the label(Banerjee & Solomonb, 2003; Thøgersen, 2000). On the other hand, the importance of the carbon labels can be created based on an individual's level of environmental concern, perceived consumer effectiveness, or norms(Teisl *et al.*, 2008).

The perception of carbon labels has a significant effect on consumers' attitude and behavioral intention(Lee & Kim, 2017; Moon & Lee, 2013; Teisl *et al.*, 2008). Moon and Lee(2013) examined the effect of perceived eco-labels on product evaluation and purchase situation. The results showed that perceived importance and credibility of eco-labels had positive effects on perceived quality, perceived value, and purchasing intention. Lee and Kim(2017) explored how the perception of carbon labels affected hotel choice by applying the theory of planned behavior. The findings indicated that perception of importance and credibility toward carbon labels had significant effects on affective attitude, cognitive attitude, subjective norm, and perceived behavioral control, which ultimately influenced the intention to visit carbon-labeled hotels.

However, the perception of carbon labels can vary according to demographics. For instance, Ozanne *et al.*,(1999) observed how gender influences the perception of forest certification. The findings indicated that there were considerable differences in the perception of importance toward forest certification between male and female. Women had a higher perceived importance of the certification than men. Teisl *et al.*,(2008) examined the demographic differences in eco-labels. The results stated that the female and higher educated group had a greater perceived importance of eco-labeling while older age and well-educated group had a higher perceived credibility of eco-labels.

3. Attitude

Attitude indicates an individual' positive or negative evaluative towards a specified object(Ajzen & Fishbein, 1980). Attitude is an important predictor of behavioral intention and behavior(Kotchen & Reiling, 2000). An individual tends to have a positive attitude when the outcomes of a specific behavior are positively evaluated(Song, Lee, Kang, & Boo, 2012). Consumers generally have a positive attitude toward carbon labels and carbon-labeled products(Guenther *et al.*, 2012).

However, attitude toward carbon labels or carbon-labeled products can be different according to demographic characteristics. According to the research by Chen and Chai(2010), women had more favorable attitudes to green products than men.

D'Souza *et al.*,(2007) examined the demographic differences in attitude towards eco-labels. The findings showed that older age and higher income consumers had more positive attitudes about eco-labels than the younger generation and the lower income group. Mostafa(2007) investigated gender differences in the attitude toward green purchasing behavior. The findings presented that male had more positive attitudes toward green purchasing behavior than female. Cottrell(2003) verified demographic differences in attitudes toward eco-friendly behaviors. The results indicated that the low-income group has the strongest attitudes toward environmentally friendly behaviors.

4. Behavioral intention

Behavioral intention refers to a person's degree of willingness to engage in a specific behavior(Ajzen & Fishbein, 1980). Behavioral intention is regarded as an influential determinant of behavior(Lam & Hsu, 2004). The intention to visit carbon-labeled hotels can be considered as one of the environmentally friendly behaviors(Stern, 2000). Promoting positive behavioral intention of consumers is an important goal of hotel management because behavioral intention represents consumer's plans to purchase products(Han & Back, 2008).

Numerous studies have verified that eco-friendly behavior is greatly associated with demographic characteristics. In research of gender difference, most of the studies are consistent with the fact that the female tends to make more green purchasing decisions than male does(Han, Hsu, & Lee, 2009; Han *et al.*, 2011; Laroche, Bergeron, & Barbaro-Forleo, 2001; Loureiro, McCluskey, & Mittelhammer, 2002; Ozanne *et al.*, 1999; Roberts, 1996). In terms of age differences, the results of studies were considerably mixed. While some studies showed that the younger age group tended more to demonstrate green behaviors(Han *et al.*, 2011; Moon, Florkowski, Brückner, & Schonhof, 2002), the other studies verified that the older age group tended more to do so(Han *et al.*, 2009; Roberts, 1996). Individuals who were married and had children were observed to show environmentally friendly behaviors(Laroche *et al.*, 2001; Loureiro *et al.*, 2002). Laroche *et al.*,(2001) stressed that married people having children tend to consider more environmental issues for

their partner and children's future as a strong motivation. In respect of the differences in an education level, most studies have found that highly educated people tend to do environmentally friendly behaviors(do Paço & Raposo, 2009; Roberts, 1996; Zhao & Zhong, 2015). In the aspects of income differences, some studies showed that higher levels of income group were more likely to exhibit environmentally friendly behaviors(do Paço & Raposo, 2009), whereas the other studies indicated that lower income classes appeared to display more environmentally friendly behaviors(Roberts, 1996). In related to eco-friendly behavioral intention in hotel sector, Han *et al.*,(2011) examined the demographic differences in visit intention to green hotel. The results indicated that female, younger age, lower income, and higher education group were greater likely to visit a green hotel. However, there were no significant differences in visit intention to green hotel according to age, education, and income, while gender had a statistically significant effect on visit intention to green hotel.

III. Methodology

1. Measurements

The questionnaire was composed of three sections. The first section contained questions about the perceived importance and credibility of carbon labels with eight items based on existing validated measures from previous research(Lee & Kim, 2017; Moon & Lee, 2013; Teisl *et al.*, 2008). The second section included questions about attitudes and behavioral intention toward carbon-labeled hotels with eight items and four items, respectively(Han *et al.*, 2009; Han *et al.*, 2011; Lee & Kim, 2017). All constructs were measured with multiple items using a 5-point Likert-type scale ranging from 1=strongly disagree to 5=strongly agree. The last section contained demographic questions including gender, age, marital status, presence of children, occupation, education, and household income. All of the measurement items were modified from feedback from three academic professionals to avoid overlap, irrelevance, and vagueness of measurement items.

2. Data collection and sample characteristics

An online survey through an online survey research firm was used from Korean consumers of over 20 years old who perceive carbon labels February 12th, 2015 to March 13th, 2015. A total of 1,001 usable questionnaires were obtained for the analysis. Of 1,001 respondents, 57.6% were female and 42.4% were male. 55.5% of participants were married and 43.6% were single. 49.5% of respondents had children and 50.5% had no children. A majority of the respondents were 30s(43.3%) and 20s(32.8%) with relatively high education level(86.7% had at least a college degree). 39.1% of respondents had monthly income level of 1-2.9 million Won and 29.9% of respondents had 3-4.9 million Won.

3. Data analysis

This study used SPSS 22 to analyze the data. Exploratory factor analysis was employed for identifying underlying dimensions, using the principal component method with varimax rotation. A reliability coefficient was computed to verify the internal consistency of items with each dimension. An analysis of variance (ANOVA) and a post hoc test(Fisher's LSD) were employed to investigate differences in perception, attitude, and behavioral intention across demographic characteristics.

IV. Results

1. Exploratory factor analysis

<Table 1> indicates the results of exploratory factor analysis. All factor loadings had the high level of reliability coefficient, ranging from .840 to .951. Also, the Kaiser-Myeyer-Olkin value exceeded the suggested value of 0.6(Kaiser, 1974) and Bartlett's Test of Sphericity reached a statistical significance with eigenvalue over 1 in all of the factors. The dimensions of perceived credibility, perceived

importance, attitude, and behavioral intention explained 42.073%, 34.565%, 74.513%, and 80.234% of the total variance, respectively.

<Table 1> The results of exploratory factor analysis

Factors and Items	Factor loading	Eigen value	Variance explained	α
Perception of credibility				
I trust the certification authority of carbon labels.	.915	3.366	42.073%	.940
I trust the certification criteria of carbon labels.	.890			
I trust carbon-labeled products.	.886			
I trust carbon labels.	.857			
Perception of importance				
Carbon labels are important criteria when purchasing products.	.858	2.765	34.565%	.840
I check carbon labels when purchasing products or services.	.856			
Carbon labels are important to me.	.797			
I think carbon labels are very important marks.	.652			
Sum of variance=76.638%, KMO=.860, Chi-Square=5899.845, Sig.=.000				
Attitude				
Staying at a carbon-labeled hotel is pleasant.	.891	5.961	74.513%	.951
Staying at a carbon-labeled hotel is gratifying.	.885			
Staying at a carbon-labeled hotel is wise.	.877			
Staying at a carbon-labeled hotel is valuable.	.873			
Staying at a carbon-labeled hotel is useful.	.868			
Staying at a carbon-labeled hotel is enjoyable.	.840			
Staying at a carbon-labeled hotel is beneficial.	.838			
Staying at a carbon-labeled hotel is interesting.	.831			
Sum of variance=74.513%, KMO=.931, Chi-Square=7732.850, Sig.=.000				
Behavioral intention				
I am willing to stay at a carbon-labeled hotel in the future.	.916	3.209	80.234%	.917
I will make an effort to stay at a carbon-labeled hotel.	.897			
I plan to stay at a carbon-labeled hotel in the future.	.887			
I intend to stay at a carbon-labeled hotel in the future.	.882			
Sum of variance=80.234%, KMO=.841, Chi-Square=2903.371, Sig.=.000				

2. The differences in perception of carbon labels

1) The differences in perception of credibility

<Table 2> represents the differences in perception of credibility across demographics. The ANOVA tests revealed that while there were significant

differences in perception of credibility across gender(F=5.708, p=.017), age(F=3.434, p=.008), and education(F=3.576, p=.014), there was no significant differences in perception of credibility across marital status(F=.076, p=.927), presence of children (F=.397, p=.529), and income(F=.851, p=.514). Mean scores for perception of credibility were higher for female(M=3.226 SD=.733) than male(M=3.186, SD=.821). 50s years age group(M=3.371, SD=.795) had the highest mean scores, followed by 20s(M=3.290, SD=.759), over 60s(M=3.250, SD=.791), 40s(M=3.246, SD=.826), and 30s years age group(M=3.112, SD=.746).

Post-hoc comparisons using the Fisher's LSD presented that the mean score for the 20s years age group was significantly different from the 40s and 50s years age group. Also, the mean score for the 30s years age group was significantly different from the 40s and 50s years age group. The mean scores for perceived credibility of carbon labeling indicated that the university education group(M=3.278, SD=.752) had the greatest mean scores, followed by two-year college(M=3.145, SD=.766), less than high school(M=3.113, SD=.766), and more than graduate school(M=3.077, SD=.873). The mean score for university group was significantly different from the other education group in the perception of credibility.

<Table 2> The results of the differences in perception of credibility

Demographic factors		M(SD)	F	P	Demographic factors		M(SD)	F	P
Gender	Male	3.186(.821)	5.708	.017	Age	20-29	3.290(.759)	3.434	.008
	Female	3.226(.733)				30-39	3.112(.746)		
Marital status	Single	3.206(.769)	.076	.927		40-49	3.246(.826)		
	Married	3.211(.770)				50-59	3.371(.795)		
	Others	3.306(1.059)				60+	3.250(.791		
Presence of children	NO	3.187(.762)	.397	.529	Monthly income level	Less than million Won	3.262(.723)	.851	.514
	Yes	3.233(.780)				1-2.9 million Won	3.168(.787)		
Education level	Less than high school	3.113(.766)	3.576	.014		3-4.9 million Won	3.201(.746)		
	Two-year college	3.145(.766)				5-6.9 million Won	3.292(.833)		
	University	3.278(.752)				7-8.9 million Won	3.375(.817)		
	More than graduate school	3.077(.873)				Over 9 million Won	3.075(1.035)		

2) The differences in perception of importance

The ANOVA tests revealed that while there were significant differences in perception of importance according to gender(F=11.386, p=.001), age(F=10.429, p=.000), marital status(F=9.298, p=.000), and income(F=5.540, p=.000), there was no difference in presence of children(F=.178, p=.673) and education level(F=1.289, p=.277) as shown in <Table 3>. Mean scores for perception of importance were higher for male(M=2.968, SD=.759) than female(M=2.893, SD=.648). 50s years age group(M=3.279, SD=.829) had the highest mean scores, followed by over 60s(M=3.091, SD=.595), 40s(M=3.089, SD=.690), 30s(M=2.921, SD=.678), and 20s years age group(M=2.777, SD=.667).

<Table 3> The results of the differences in perception of importance

Demographic factors		M(SD)	F	P	Demographic factors		M(SD)	F	P
Gender	Male	2.968(.759)	11.386	.001	Age	20-29	2.777(.667)	10.429	.000
	Female	2.893(.648)				30-39	2.921(.678)		
Marital status	Single	2.818(.692)	9.298	.000		40-49	3.089(.690)		
	Married	3.008(.687)				50-59	3.279(.829)		
	Others	3.000(1.023)				60+	3.091(.595)		
Presence of children	NO	2.811(.678)	.178	.673	Monthly income level	Less than million Won	2.810(.609)	5.540	.000
	Yes	3.042(.670)				1-2.9 million Won	2.853(.705)		
Education level	Less than high school	2.835(.766)	1.289	.277		3-4.9 million Won	2.997(.699)		
	Two-year college	2.893(.766)				5-6.9 million Won	3.106(.708)		
	University	2.952(.752)				7-8.9 million Won	3.375(.689)		
	More than graduate school	2.966(.873)				Over 9 million Won	3.175(1.021)		

Post-hoc comparisons using the Fisher's LSD presented that the mean score for the 20s years age group was significantly different from the 40s and 50s years age group. Also, the mean score for the 30s years age group was significantly different from the 40s and 50s years age group. The married group had the highest mean scores(M=3.008, SD=1.023) among the other groups such as widow or widower

(M=3.000, SD=1.023), and single group(M=2.818, SD=.692). 7-8.9 million Won income group(M=3.375, SD=.689) had the greatest mean scores, followed by over 9 million Won(M=3.175, SD=1.021), 5-6.9 million Won(M=3.106, SD=.708), 3-4.9 million Won(M=2.997, SD=.699), 1-2.9 million Won(M=2.853, SD=.705), and less than million Won income group(M=2.810, SD=.609). According to the results of the ANOVA, there were statistically significant differences in perception of importance (F=5.540, p=.000). The findings of Fisher's LSD analysis identified that the mean scores for less than million Won income group were significantly different from the 3-4.9 million Won, 5-6.9 million Won, and 7-8.9 million Won income group. The mean scores for 1-2.9 million Won income group were significantly different from the 3-4.9 million Won, 5-6.9 million Won, and 7-8.9 million Won income group. The mean scores for 3-4.9 million Won income group were considerably different from 7-8.9 million Won income group.

3. The differences in the attitude toward carbon-labeled hotels

<Table 4> indicates the differences in the attitude toward carbon-labeled hotels. There were significant differences in age(F=2.683, p=.030), marital status(F=3.972, p=.019), presence of children(F=4.929, p=.027), education(F=4.710, p=003), and income(F=2.763, p=.017) except gender(F=1.956, p=.162). The results showed that mean scores in attitude toward carbon-labeled hotels for 50s(M=3.613, SD=.826) were the highest, followed by 40s(M=3.563, SD=.653), 30s(M=3.411, SD=.705), 20s(M=3.407, SD=.668), and over 60s(M=3.330, SD=.621).

According to the analysis of post hoc test(Fisher's LSD), mean scores of 20s years age group were significantly different from both 40s and 50s age group. The mean scores of 30s years age group were significantly different from both 40s and 50s age group. The attitude toward carbon-labeled hotels significantly differs between single(M=3.380, SD=.681) and married group(M=3.494, SD=.702). Thus, the married group showed more positive attitudes toward carbon-labeled hotels than the single group. The mean scores for presence of children indicated that respondents who have children(M=3.505, SD=.714) had higher positive attitudes toward carbon-labeled hotels than people who do not have children(M=3.389, SD=.670).

Mean scores for the university group(M=3.511, SD=.663) had the highest mean value, followed by the two-year college(M=3.410, SD=.738), more than the graduate school(M=3.351, SD=.709), and less than the high school group(M=3.290, SD=.711). The mean scores for high school group were significantly different from the university group and the university group were considerably different from more than the graduate school group. Mean scores for 7-8.9 million Won group(M=3.703, SD=.781) had the highest, followed by 3-4.9 million Won group(M=3.527, SD=.678), 5-6.9 million Won(M=3.494, SD=.778), less than million Won(M=3.450, SD=.630), 1-2.9 million Won(M=3.368, SD=.695), and over 9 million Won(M=3.138, SD=.910). The result of Fisher's LSD analysis that there were significantly different between 1-2.9 million Won income group and 3-4.9 million Won income group. Also, there were significantly different between 7-8.9 million Won income group and over 9 million Won income group.

<Table 4> The results of the differences in the attitude toward carbon-labeled hotels

Demographic factors		M(SD)	F	P	Demographic factors		M(SD)	F	P
Gender	Male	3.386(.719)	1.956	.162	Age	20-29	3.407(.668)	2.683	.030
	Female	3.491(.672)				30-39	3.411(.705)		
Marital status	Single	3.380(.681)	3.972	.019		40-49	3.563(.653)		
	Married	3.494(.702)				50-59	3.613(.826)		
	Others	3.708(.586)				60+	3.330(.621)		
Presence of children	NO	3.389(.670)	4.929	.027	Monthly income level	Less than million Won	3.450(.630)	2.763	.017
	Yes	3.505(.714)				1-2.9 million Won	3.368(.695)		
Education level	Less than high school	3.290(.711)	4.710	003		3-4.9 million Won	3.527(.678)		
	Two-year college	3.410(.738)				5-6.9 million Won	3.494(.778)		
	University	3.511(.663)				7-8.9 million Won	3.703(.781)		
	More than graduate school	3.351(.709)				Over 9 million Won	3.138(.910)		

4. The differences in behavioral intention toward carbon-labeled hotels

<Table 5> indicates the results of the differences in the intention to visit carbon-labeled hotels. There were significant differences in age(F=3.638, p=.006), education(F=3.886, p=.009), and income(F=3.383, p=.005). However, there was no difference in gender(F=.134, p=.715), marital status(F=2.970, p=.052), and presence of children(F=.727, p=.394). Mean scores in visit intentions toward carbon-labeled hotels for 50s(M=3.571, SD=.839) were the highest, followed by over 60s(M=3.409, SD=.422), 40s(M=3.281, SD=.704), 30s(M=3.239, SD=.717), and 20s(M=3.195, SD=.733).

A post hoc test(Fisher's LSD) for age group indicated that mean scores for the 20s years age group were significantly different from 30s, 40s, and 50s years age group. The mean scores for the 50s years age group were significantly different from 30s and 40s age group. Mean scores for University education group(M=3.315, SD=.694) had the highest mean value, followed by two-year college(M=3.213, SD=.750), more than graduate school(M=3.190, SD=.748), and less than high school(M=3.096, SD=.804). The mean scores for less than the high school group were significantly different from the university education group. Mean scores for 7-8.9 million Won income group(M=3.734, SD=.686) had the highest, followed by 5-6.9 million Won income group(M=3.384, SD=.818), 3-4.9 million Won income group(M=3.309, SD=.702), less than million Won income group(M=3.205, SD=.733), 1-2.9 million Won income group(M=3.181, SD=.716), and over 9 million Won income group(M=3.175, SD=.635). The mean scores for the less than million Won income group were significantly different from 5-6.9 million Won and 7-8.9 million Won income group. Also, the mean scores for the 1-2.9 million Won income group were significantly different from 3-4.9 million Won, 5-6.9 million Won, and 7-8.9 million Won income group. Furthermore, the mean scores for the 3-4.9 million Won income group were significantly different from 7-8.9 million Won income group.

<Table 5> The results of the differences in intention to visit carbon-labeled hotels

Demographic factors		M(SD)	F	P	Demographic factors		M(SD)	F	P
Gender	Male	3.231(.748)	.134	.715	Age	20-29	3.195(.733)	3.638	.006
	Female	3.269(.716)				30-39	3.239(.717)		
Marital status	Single	3.189(.748)	2.970	.052		40-49	3.281(.704)		
	Married	3.303(.711)				50-59	3.571(.839)		
	Others	3.278(.805)				60+	3.409(.422)		
Presence of children	NO	3.201(.737)	.727	.394	Monthly income level	Less than million Won	3.205(.733)	3.383	.005
	Yes	3.307(.719)				1-2.9 million Won	3.181(.716)		
Education level	Less than high school	3.096(.804)	3.886	.009		3-4.9 million Won	3.309(.702)		
	Two-year college	3.213(.750)				5-6.9 million Won	3.384(.818)		
	University	3.315(.694)				7-8.9 million Won	3.734(.686)		
	More than graduate school	3.190(.748)				Over 9 million Won	3.175(.635)		

V. Conclusion

The major purpose of this paper is to analyze the demographic differences in perception, attitude, and behavioral intention toward carbon labels in the hotel industry. This study provides a theoretical contribution as well as a practical contribution to hotel industry for green marketing strategy through adopting carbon label scheme.

First of all, this study empirically attempted to the relationship between demographic characteristics and carbon label as a specific and specialized eco-label among over 430 eco-labels which have been used in a variety of industry sectors across the world(Gössling & Buckley, 2016). Although some researchers have identified the relationship the between demographic characteristics and eco-labels or eco-labeled products(D'Souza *et al*., 2007; Ozanne *et al*., 1999; Teisl *et al*., 2008), few research has been conducted to evaluate the relationship between demographic characteristics and carbon labeling in hotel sector. Therefore, the current study

contributes to the very limited literature on the relationship between demographic differences and carbon labels in hotel industry. This study particularly analyzed the demographic differences in perception, attitudes, and behavioral intention to appreciate consumers' responses to carbon labeling. All of the perception, attitude, and behavioral intention toward carbon label that appeared depends on the demographic characteristics. Thus, researchers should consider perception, attitudes, and behavioral intention related to consumers' response when investigating carbon labeling issues. Researchers also should not overlook the potential differences among various demographic variables. Although consumer demographics alone are limited to describing green market segments, consumer demographics provide useful information to profile green consumers(D'Souza *et al*., 2007).

Second, this research revealed that consumers' perception, attitudes, and behavioral intentions toward carbon label differed across demographic characteristics. The findings showed that the groups with older age, married, having children, higher education, and higher income had greater perceptions of both credibility and importance of carbon labels. Perceived credibility of carbon labels was significantly related to gender, age, and education, while perceived importance of carbon labels was significantly influenced by gender, age, and income level. Whereas the credibility of the carbon labels was higher for the female, the importance of the carbon labels was higher for the male. The findings were, in general, consistent with previous studies about demographic differences in perception of eco-labels(Ozanne *et al*., 1999; Teisl *et al*., 2008). In addition, individuals who were female, older age, married, having children, higher education, and higher income were more likely to exhibit positive attitudes and visit intentions toward carbon-labeled hotels. However, the results indicated that while gender was found to be not significantly related to attitudes toward carbon-labeled hotels, the factors including gender, marital status, and presence of children were not significantly related to intentions to visit carbon-labeled hotels. By and large, the findings were consistent with prior studies about demographic differences in environmentally conscious attitudes and behaviors (Cottrell, 2003; do Paço & Raposo, 2009; Han *et al*., 2009; Laroche *et al*., 2001; Loureiro *et al*., 2002; Mostafa, 2007; Roberts, 1996; Zhao & Zhong, 2015). From a practical point of view, the findings provide managers and marketers of hotels with

useful information to recognize the demographic characteristics for their target segment. Consumers who are older age, married, having children, higher education, and higher income have not only positive perception of carbon label but also favorable attitudes and visit intentions toward carbon-labeled hotels. If hotels participate in green management strategies by adopting carbon labels, the hotels can extend new target markets targeting at the consumer group. Moreover, since carbon labels have been implemented in common all around world, hotels located in other countries as well as Korean hotels can achieve competitiveness by adopting carbon label as an effective marketing strategy to attract more customers. Consumers would be more likely to judge that carbon-labeled hotels make greater efforts to protect environment with a strong responsibility. Therefore, hotels should establish a marketing strategy through adopting carbon label scheme focusing on the group of customers who have more favorable attitudes and visit intention to carbon-labeled hotels.

Lastly, the results of the this study indicated that consumers generally have less positive perception of carbon label, compared to attitudes and behavioral intention toward carbon-labeled hotel. Therefore, managers and marketers of carbon labels should promote carbon label in the light of perceived credibility and importance of carbon labels. As consumers less perceived importance of carbon label than credibility of carbon label, the institute managing carbon labeling should actively inform and persuade less perceived group about the effectiveness of carbon labels through advertising and public relations focusing on the importance of carbon label. Managers and marketers of the institutes should completely educate individuals through brochures, posters, guidebooks, exhibitions, or seminars. Educational programmes about carbon labeling would reinforce the importance and credibility of the carbon labels with the formation of favorable attitudes toward carbon labels. Such efforts may eventually enhance consumers' eco-friendly purchasing decision making. Thus, institutes of carbon labeling must make greater efforts to promote carbon labeling schemes and education programs in order to heighten the public's concern about carbon labels as an environmental policy to mitigate climate change.

Despite of the significant theoretical and managerial implications, this paper has several limitations. Firstly, this paper focused on carbon labels applying lodging

industry. If the research is applied to other types of tourism products or services, the findings will be different. Specially, consumers' attitudes and purchasing intention may differ in other sectors of tourism industry such as transportation, restaurants, or souvenirs. Thus, future research could be expanded to more tourism product or service categories to assess the individual differences. Secondly, this study assessed demographic characteristics including gender, age, presence of children, marital status, education, and income as individual differences. If the survey is expanded to investigate individual differences such as personality, it will provide new perspectives for better marketing strategies through more broadly and deeply understanding consumers. For example, eco-friendly behaviors differ according to personality(Brick & Lewis, 2016). Lastly, this study conducted a survey of consumers who perceive carbon label. Therefore, it would be meaningful to explore the group difference between those who perceive carbon label and those who do not.

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