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Can Companies Induce Sustainable Consumption? The Impact of Knowledge and Social Embeddedness on Airline Sustainability Programs in the U.S.

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Abstract: This paper investigates how consumers' level of knowledge and social embeddedness can influence sustainable consumption. An extended model of goal-directed behavior (MGB) is tested by U.S. airline consumers who have participated in UNICEF's Change for Good (CFG) and voluntary carbon offsetting (VCO) programs. Results show that consumers' knowledge positively influenced their subjective norms and attitudes towards participation of VCO and CFG. Increasing consumers' sense of social embeddedness is also found to be crucial in forming their subjective norms for both CFG and VCO. Moreover, positive anticipated emotion is found to influence consumers' desire to participate in VCO, while negative anticipated emotion influences desire towards CFG participation. The findings of this research provide a practical implication on strategies for the airline industry to induce sustainable consumption behavior, as well as demonstrate the need for different emotional elicitation strategies for different sustainability programs.

Keywords: sustainable consumption; model of goal-directed behavior; knowledge; social embeddedness; voluntary carbon offsets; Change for Good

1. Introduction

With growing interest in sustainable consumption from the general public, most airlines have been promoting their environmentally and socially sustainable business practices. Airlines have begun to publish sustainability reports, while operating environmentally and socially sustainable consumption programs such as VCO (voluntary carbon offsets) and CFG (Change for Good). There have been some successful cases in boosting airlines' sustainable image; a 2011 inter-industry study has found that the airline industry overall was perceived by consumers as being greener than their actual performances [1]. Despite airlines' efforts in pursuing sustainable business practices, the airline industry's responsibility continues to grow due to rapidly increasing global air travel demand. In 2012, the airline industry accounted for approximately 12% of global transportation CO₂ emissions. In addition, with 31% projected rise in passenger demand between 2012 and 2017 [2], there has been an increasing pressure from the international community to reduce the environmental impact of air travel. Amidst all this, a new approach of involving consumers directly in sustainable business practice has begun garnering attention. A series of established studies has shown that consumer-to-business interactions positively influence a customer's propensity towards the company and its products [3–5]. As mitigation of emissions via monetization far outweighs the emission reduction potentials of technological and operational improvements in aviation [6], persuading consumers to partake in the airline industry's emission mitigation efforts is poised to be a much needed part of future operations.

The airline industry operates two such representative consumer-involved sustainability programs. One is a pro-environmental sustainability program known as voluntary carbon offsetting (VCO), while the other is a pro-social program known as Change for Good (CFG) in partnership with UNICEF. VCO is a recently conceived program where passengers can volunteer to contribute in negating the negative effects of the CO₂ they are responsible for through financial means. By late 2013, over 35 airlines offered a variant of the carbon offset program [7]. Although airline companies have been providing various motives to participate in VCO, consumer participation has been low; British airways, the first and one of the more successful airlines to introduce voluntary carbon offsetting, had a consumer involvement rate of just 0.32% in 2010 [8]. UNICEF's Change for Good (CFG) program, on the other hand, has been ongoing in nine different airlines since 1987. Since its inception, the program has generated over \$70 million. By collecting small quantities of coins from passengers across the globe, UNICEF is able to deliver the financial support to needy countries, successfully contributing to social sustainability. However, the diffusion of CFG has been limited to a handful of dedicated airlines, such as Cathay Pacific and Asiana Airlines, despite having been in operation for over 20 years. Such a trend is a symptom of a bigger phenomenon whereby the general consumer population chooses not to actively pursue sustainable consumption. With the majority of consumers having passive attitudes towards participation in sustainable consumption, there is a need for external forces to shape consumers' intention to participate in sustainable consumption.

In light of this, this study seeks to understand the driving forces behind sustainable consumption. Prior studies have explored the role of attitudes, perceived behavioral control, and subjective norms (theory of planned behavior) followed by positive and negative emotions (model of goal-directed behavior). Along with such factors, we seek to understand how external factors such as level of knowledge and sense of belongingness interact with internal factors (attitude, subjective norms, and

perceived behavioral control) to shape consumer participation in sustainable consumption. These relations were empirically tested using the structural equation modeling (SEM) on the survey results of 160 VCO and 163 CFG respondents who have had experience participating in the respective programs. Comparing the results of an established and long-running pro-social program (CFG, since 1987) against the less-matured VCO program allows us to highlight VCO's shortcomings and differences. This study shows why companies need to deliver proper information that supports a consumer's decision-making process rather than exclusively promoting a green image [9]. We also demonstrate that even within the same business sector, different strategies are needed to address consumers' responses to different styles of sustainability programs.

The rest of the paper is organized as follows. First, an in-depth look into these two sustainability programs is provided in Section 2, followed by a literature review and hypotheses in Section 3. Research methodology is discussed in Section 4, and results and a discussion are provided in Section 5, followed by the conclusion in Section 6.

2. Sustainability Programs in the Aviation Industry

There are two representative consumer volunteering sustainability programs in the aviation industry: VCO and CFG. We investigate the two programs' backgrounds, as well as existing related studies.

2.1. Voluntary Carbon Offsetting

Voluntary carbon offsetting (VCO) is a pro-environmental program offered by airlines allowing passengers to pay for the amount of CO₂ they are personally responsible for during the course of a flight, with proceeds contributed or distributed to external third-party programs that offset the equivalent amount of CO₂. A 2011 survey by the U.S. Department of Energy has shown that consumers had much lower awareness of carbon offsetting (36%) compared with other renewable energy concepts, such as carbon footprint (73%) or renewable power (71%). The survey results argued that carbon offsetting's closer linkage to the business community rather than consumers, as well as the media's lack of attention to carbon offsetting in general, may be the reasons for such a low level of awareness [10]. This highlights the need to bring awareness and increase participation for the VCO program.

Our inquiry into the top ten airlines in the U.S. (according to Bureau of Transportation 2013 Statistics) has shown that none of these airlines actively advertised nor offered carbon offsetting during checkout, and required customers to take their own initiative in searching for VCO programs. Only one airline, Virgin Air, distinguished itself by making carbon offsetting available in flight via the in-flight entertainment system. From an academic standpoint, investigation into consumers' willingness to participate in the VCO program is a relatively new but growing field of research. Studies by Brouwer *et al.* [11], followed by Lu and Shon [12], utilized contingent valuation methods to assess airline passengers' Willingness to Pay (WTP) for offsetting their CO₂ emissions. MacKerron *et al.* [13] also utilized a choice model framework to investigate WTP for variations of VCO programs. Beyond the quantitative analysis of passenger participation in VCO, there are number of studies about what factors drive participation of the VCO program. Whitmarsh and O'Neill [14] have shown that the concern for environments is not the only influencing factor in pro-environmental behavior. Lu and Shon [12] found that passengers' understanding and knowledge surrounding emissions and offset

schemes have significant effects in their intentions. Further findings suggest that people act differently across different domains and with different motives for pro-environmental behavior.

2.2. UNICEF's Change for Good in Airline Industry

Established in 1987, the Change for Good program with UNICEF has been recognized as one of the best-known and longest-running partnerships with airlines. Within this program, airlines collect international travelers' spare foreign coins. Passengers deposit their surplus currency in envelopes provided by the airlines, which is later donated directly to UNICEF. The airlines currently involved are Aer Lingus, Alitalia, All Nippon Airways (ANA), American Airlines, Asiana Airlines, Cathay Pacific, Finnair, JAL and QANTAS, who inform passengers of this program via in-flight videos. Since its inception, the program has generated over \$70 million.

Although small quantities of foreign coins are useless for travelers who return to their home country, millions of dollars are collected and used in various UNICEF programs that help children around the world. As Change for Good can be targeted directly to passengers and can produce immediate results, it does not require extensive advertising and therefore is a highly cost-efficient cause marketing campaign [15]. The studies related to Change for Good are virtually non-existent.

3. Literature Review and Hypotheses

3.1. Model of Goal-Directed Behavior

As a predecessor to the model of goal-directed behavior (MGB), the theory of planned behavior (TPB) by Ajzen [16] is the most widely applied model of cognitive antecedents of such pro-environmental behavior [17–19]. TPB posits that intention is determined by one's attitude towards behavior, subjective norms, and perceived behavioral control. However, more recent studies have shown that inclusion of affective factors can better explain people's pro-environmental behaviors [20,21]. Perugini and Bagozzi suggest MGB to add new concepts of desire and anticipated emotions that TPB lacked in explaining consumers' intention [22]. Within the MGB framework, desire is incorporated as a key mediating variable through which all determinants influence intention. As the distinctive component of MGB framework, desire is defined as "...a state of mind whereby an agent has a personal motivation to perform an action or to achieve a goal," according to Perugini and Bagozzi [23]. The essential concept of desire embodies one's future orientation towards an act [24]. Chen [25] utilized the model of goal-directed behavior (MGB) to investigate VCO participant intentions. Chen's model explained 72% of the variance of desires and 53% of intention to participate, an improvement compared to previous approach with TPB by van Birgelen [26]. Previous researches have already demonstrated desire's validity as a predictor of pro-environmental intentions [22,25,27]. Perugini and Bagozzi [22] argued that due to the strong motivational content inherent to the concept of desire, it is a more effective predictor of intention than attitudes, subjective norms, and perceived behavioral control found in the theory of planned behavior. As such, we propose the following:

H1a: Increased desire will exert a positive influence towards intention to VCO participation

H1b: Increased desire will exert a positive influence towards intention to CFG participation

3.1.1. Influence of TPB Antecedents on Desire

The theory of planned behavior (TPB) framework includes attitudes, subjective norms, and perceived behavioral control to predict and explain individual behaviors [16]. Attitude can be defined as a predisposed evaluative response towards performing the target behavior, which is automatically triggered when exposed to or thought about [28]. Previous studies have shown that attitude can influence behavioral desire in sustainability actions [29]. Subjective norms is a measure of how an individual's behavior is influenced by the perceived judgment or behavior of significant others [16]. According to Venkatesh *et al.* [30], if the influences from a particular group or society to which one belongs to are significant, then one will desire to comply with such societal or group norms, thereby presenting a positive image of oneself to members of partaking social group.

H2a: Positive attitude will exert a positive influence on desire towards VCO participation

H2b: Positive attitude will exert a positive influence on desire towards CFG participation

H2c: Positive subjective norms will exert a positive influence on desire towards VCO participation

H2d: Positive subjective norms will exert a positive influence on desire towards CFG participation

Perceived behavioral control refers to an individual's perceived ease or difficulty of performing a given behavior. Previous studies have shown that the belief that one has control over a situation can exert a strong influence on behavioral desires [29]. This was indeed the case for general pro-environmental activities, such as recycling and choosing to ride a bicycle or bus [31,32].

H3a: Perceived behavioral control will have a positive influence on desire towards VCO participation

H3b: Perceived behavioral control will have a positive influence on desire towards CFG participation

3.1.2. Influence of Anticipated Emotions on Desire

The distinctive factor of MGB is the concept of anticipated emotions, which TPB does not take into consideration. Anticipated emotions can be defined as anticipated affective reactions of one's actions being successful or failing its intended goal when deciding whether or not to act [33]. Anticipated emotions are measured separately into positive and negative emotions, for measuring how one would feel if one's goal succeeded or failed, respectively. Anticipated emotions affect desires through what Gleicher *et al.* [34] calls "prefactual appraisals," where one "...considers imaginary alternatives to events in terms of the implications of these events for the future," which in turn leads to positive or negative emotions. Chen's [25] results on the VCO program indicate that positive anticipated emotions have a significant effect on desire to participate in the VCO program, while the relationship between negative anticipated emotions and desire is found to be insignificant. However, the role of emotions on intention to give help to abused children was also studied by Bagozzi and Moore [35], whereby the results showed that stronger negative emotions in the audience led to increased decision to help children in need. As such, this study will consider both positive and negative anticipated emotions in our research framework. We propose the following:

H4a: Positive anticipated emotions will exert a stronger positive influence on desire for VCO

H4b: Negative anticipated emotions will exert a stronger positive influence on desire for CFG

3.2. Knowledge and Social Embeddedness

Many studies have found that consumer-to-business interactions positively influence customers' propensity towards the companies and their products [3–5]. However, with participation of such consumer-oriented sustainability programs being minimal, there is a need for the airline industry to address this issue by finding effective external factors that can induce participation of sustainable consumption. We thus investigate two factors: knowledge and social embeddedness. Lee *et al.* [36] and Delmas and Burbano [37] emphasize that delivery of proper information and knowledge aids a consumer's decision making of sustainable behavior. Kenney and Goe [38] have shown that for actions of voluntary nature such as sustainable consumption, individuals' decisions are not a sole function of self-interest, but also influenced by the network of social relationships. With this in mind, in the next section we briefly discuss how these two factors—knowledge and social embeddedness—are relevant within the context of VCO and CFG, and offer pertinent hypotheses.

3.2.1. Knowledge

Knowledge is the necessary precondition in forming an attitude [39]. Knowledge serves two key functions in sustainable behavior: first, to raise the awareness of an issue and show what can be done against it; second, to empower the consumer to take the right course of desired action. Information that raises consumers' awareness and knowledge level while building social responsibility is especially important for pro-environmental behaviors [36]. In order to increase demand, industries need to supply the consumers with information that increase their knowledge. Knowledge can therefore be classified into three categories. The first category is knowledge related to the situation on hand. In the case of VCO, it would be the understanding of relevant environmental issues, whereas for CFG it would be the understanding of children's needs from the developing world. Fietkau and Kessel's sociological model postulates that knowledge of such environmental-related issues affects environmental attitude [40]. The second category is action-related knowledge, or the steps required toward participation in VCO. The third is effectiveness knowledge, an understanding of how a program like VCO or CFG works in addressing relevant issues [41]. Environmental knowledge was shown to exert positive influence on environmental attitudes, as found in Acury [42] or Bradley *et al.* [43]. It can be reasonably argued that knowledge will also increase the belief that one has control over a situation, thereby increasing perceived behavioral control. We thus propose the following:

- H5a: High level of knowledge will exert a positive influence on attitude towards the VCO program
- H5b: High level of knowledge will exert a positive influence on attitude towards the CFG program
- H5c: High level of knowledge will exert a positive influence on perceived behavioral control of the VCO program
- H5d: High level of knowledge will exert a positive influence on perceived behavioral control of the CFG program

Another key concept that must be addressed is the considerable uncertainty and controversy that the VCO market has been subjected to. Issues such as carbon leakage, non-additionality, impermanence, and double counting have been raised against offsetting projects that have been poorly managed [44]. Polonsky and Garma [45] have found that carbon offsetting was undertaken more frequently by

consumers who are less knowledgeable, indicating that uninformed consumers participate in the VCO program without understanding how their action is environmentally beneficial. Mair and Jago [46] state that customers highly knowledgeable in action and effective knowledge are less likely to participate in VCO due to understanding the limitations posed by the current generation of VCO offerings. On the other hand, UNICEF's Change for Good is not subject to such controversy. We believe that while knowledge will still positively influence attitude towards VCO, it will be weaker compared to that of CFG. Given this, we hypothesize the following:

H6a: High level of knowledge will exert a stronger positive influence on attitude towards the CFG program than the VCO program

H6b: High level of knowledge will exert a stronger positive influence on perceived behavioral control towards the CFG program than the VCO program

3.2.2. Social Embeddedness

The consumer's sense of social belongingness is an important factor in encouraging sustainable behavior. Studies in the past decade have shown substantial evidence of social connectedness influencing a person's beliefs and choices [47–49]. Social belongingness can be best measured via social embeddedness working as its proxy, which refers to how closely an individual is connected with the community. According to Lee and Burdney [50], "individuals with high levels of social embeddedness are more likely to believe that other people will also volunteer, and that they will be able to share the benefits of others' volunteering." Moreover, the connectivity to other individuals that arises from social embeddedness serves as a medium through which knowledge can diffuse amongst the individuals themselves.

In addition, consumers' sense of belongingness to the society can also be increased in order to increase their sense of social responsibility. One would make a rational comparison weighing the costs of sustainability program participation against the benefits that one provides to the community that one is embedded in [50]. If a person is more involved in a community, then it is also more likely that that person is more susceptible to forming stronger subjective norms derived from the community. Such conjectures are supported by the findings of Patchen [51], who states that pro-social and pro-environmental efforts should be structured so that individuals see their actions as part of a shared social effort. Kurz *et al.* [45] have also found that sense of community has a positive influence on participation of recycling initiatives. We subsequently propose the following hypotheses:

H7a: Higher social embeddedness will exert a positive influence on attitude towards the VCO program

H7b: Higher social embeddedness will exert a positive influence on attitude towards the CFG program

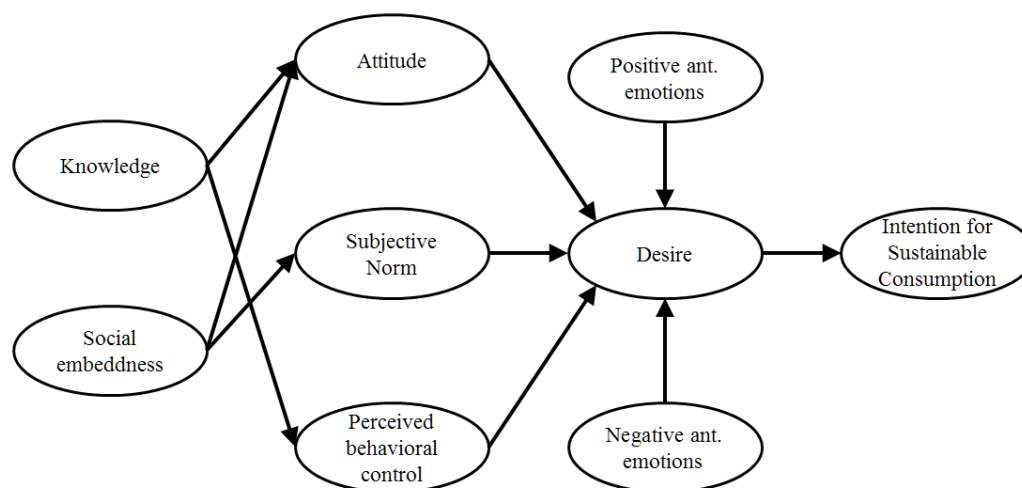
H7c: Higher social embeddedness will exert a positive influence on subjective norm towards the VCO program

H7d: Higher social embeddedness will exert a positive influence on subjective norm towards the CFG program

3.3. Proposed Research Model

Our study builds upon Perugini and Bagozzi's [22] original MGB framework. We developed an extended MGB model that further investigates social learning perspectives, as shown in Figure 1. Knowledge and social embeddedness is hypothesized to influence attitude, perceived behavior control, and subjective norm. Desire is set as the key intermediary, linking intention to the two anticipated emotions, attitude, subjective norm, and perceived behavioral control.

Figure 1. Proposed research model.



4. Research Methodology

4.1. Data Collection

The goal of this study was to understand how different factors (and their interactions) drive consumers to participate in the VCO and CFG programs. The biggest concern was ensuring that they understood what these programs are and how they work in order to make an informed opinion. It can be reasonably argued that the most reliable and surefire way to have an informed opinion would be to have a firsthand experience. As one of our key variables is knowledge, the informed passengers are appropriate for our survey. As such, it was determined that responses from only those who have previously participated in these programs would be used.

The respondents were recruited using Amazon's Mechanical Turk (MTurk). According to Buhrmester *et al.* [52], MTurk is extensively used in psychology and other social science researches, as MTurk participants are demographically diverse and highly educated. Buhrmester *et al.* concludes that MTurk "can be used to obtain high-quality data". A survey titled "US—Air travel experience survey" was opened for a period of five days. During this period, 1137 participants took the pre-screening survey, in which they were asked flight frequency and experience with the VCO and CFG programs. If the users reported taking more than one flight per year on average, and answered having taken part in the programs, they were qualified to take the survey. We also placed a secondary screening question that asked if they knew about Low Carbon Parity (LCP) or UN's Blue Opportunity. If they answered "yes" to either of them, they were also screened out of the survey as there is no such thing as

Low Carbon Parity (LCP) or UN's Blue Opportunity. This served to filter out respondents who were willing to lie and likely more susceptible to social desirability bias. The respondents' location was also checked via GeoIP, ensuring that they were indeed responding from within the United States. Of the 1317 participants, we received 160 valid responses from those who have had experience participating in VCO, and 163 valid responses from those who had experience participating in CFG.

Table 1 summarizes respondent socio-demographic profiles and experience with the VCO or CFG programs. Response rates were similar in males (66.3%, 67.5%) and females (33.7%, 32.5%) in each program. Average age was 36 years. Most respondents had completed college, with an associate degree or a bachelor's degree (53.8%, 54%) and earned less than \$85,000 (80.1%, 77.8%).

Table 1. Profile of respondents.

Categories		VCO (n = 160)	CFG (n = 163)
Gender	Male	106 (66.3%)	110 (67.5%)
	Female	54 (33.7%)	53 (32.5%)
Average Age		36 years	36 years
Education	12th grade or less	1 (0.6%)	1 (0.6%)
	High school diploma	23 (14.4%)	21 (12.9%)
	Some college	31 (19.4%)	33 (20.2%)
	Bachelor's degree	86 (53.8%)	88 (54.0%)
	Master's degree	19 (11.9)	20 (12.3%)
Annual Income (USD)	<24,999	23 (14.4%)	23 (14.1%)
	25,000–44,999	47 (29.4%)	49 (24.5%)
	45,000–64,999	26 (16.3%)	31 (19.0%)
	65,000–84,999	32 (20.0%)	33 (20.2%)
	85,000–94,999	14 (8.8%)	14 (8.6%)
	>95,000	18 (11.3%)	22 (13.5%)

4.2. Instrumental Development

The survey items were developed from previously studied and validated measures and were restated to take account of the characteristics of the VCO and CFG programs (See Table A1). All respondents answered each questionnaire item, marked on a 7-point Likert scale (e.g., from 1: strongly disagree to 7: strongly agree).

Knowledge was measured by three different items of knowledge, as proposed by McEachern and Warnaby [41]. Social embeddedness was measured using four items consisting of semantic derivations found in Kurz et al [47]. Attitude (three items), subjective norm (three items), and perceived behavioral control (three items) were measured using items validated by Casaló *et al.* [53], Ajzen [54], and Marchekwa *et al.* [55]. Measures of positive anticipated emotions (four items) and negative anticipated emotions (three items) were taken from Perugini and Bagozzi [22]. Desire was measured through four items taken from Carrus *et al.* [29] and Perugini and Bagozzi [22]. Intention to participate was measured through four items taken from Carrus *et al.* [29] and Casaló *et al.* [53].

5. Results and Discussion

5.1. Measurement Reliability and Validity

A structural equation modeling (SEM) technique was used to test our model with Amos 21. Tables 2 and 3 show the means, standard deviations, and correlations among the constructs.

Table 2. Descriptive statistics and correlations of VCO.

Construct	Mean	SD	1	2	3	4	5	6	7	8
KN	5.20	1.15								
SE	4.81	1.30	0.503 **							
ATT	5.38	1.31	0.265 **	0.318 **						
SN	4.45	1.24	0.064	0.246 **	0.468 **					
PBC	5.57	1.04	0.333 **	0.385 **	0.558 **	0.181 *				
PAE	5.61	1.13	0.351 **	0.307 **	0.574 **	0.251 **	0.434 **			
NAE	4.16	1.67	0.116	0.054	0.234 **	0.114	0.142	0.300 **		
DE	4.94	1.48	0.187 *	0.377 **	0.673 **	0.660 **	0.357 **	0.448 **	0.203 **	
IN	5.18	1.42	0.221 **	0.402 **	0.701 **	0.552 **	0.443 **	0.562 **	0.273 **	0.774 **

Table 3. Descriptive statistics and correlations of CFG.

Construct	Mean	SD	1	2	3	4	5	6	7	8
KN	5.44	1.16								
SE	4.71	1.27	0.391 **							
ATT	5.71	1.26	0.546 **	0.275 **						
SN	4.72	1.38	0.323 **	0.255 **	0.397 **					
PBC	5.75	1.14	0.562 **	0.321 **	0.634 **	0.404 **				
PAE	5.70	1.20	0.454 **	0.324 **	0.656 **	0.398 **	0.591 **			
NAE	4.21	1.69	0.212 **	0.014	0.300 **	0.133	0.336 **	0.442 **		
DE	5.16	1.54	0.383 **	0.374 **	0.634 **	0.526 **	0.504 **	0.586 **	0.346 **	
IN	5.55	1.33	0.506 **	0.253 **	0.757 **	0.473 **	0.609 **	0.643 **	0.377 **	0.745 **

Note: KN = knowledge; AT = attitude; PBC = perceived behavioral control; SE = social embeddedness; SN = subjective norm; DE = desire; IN = intention; PAE = positive anticipated emotion; NAE = negative anticipated emotion
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Next, all our constructs were found to satisfy the commonly accepted minimum of 0.70, thus satisfying the scale reliability requirements (see Table A2) [56]. We also tested our model for convergent and discriminant validity for each dataset. The results indicate that all the required indices were met, namely: (1) average variance extracted (AVE) should be greater than 0.50, while CR should be greater than AVE, and (2) square root of AVE should be less than the correlation with another factor [57]. All of the requirements above were met by both datasets.

5.2. Model Fit

The overall model fit was assessed in terms of four common criteria: χ^2/df , RMSEA, CFI and IFI (see Table 4). The observed norm χ^2 for the measurement model was 1.751 ($\chi^2 = 751.007$, $df = 429$) for

VCO and 1.891 ($\chi^2 = 811.069$, $df = 429$) for CFG, both well within the recommended range of less than 3. The comparative fit index (CFI) was 0.926 and 0.914 for VCO and CFG respectively. The incremental fit index (IFI) was also 0.928 and 0.915 for VCO and CFG. Considering previous studies' recommended value levels, the measurement model shows a mix of good to adequate fit with the data collected. RMSEA (Root Mean Square Error of Approximation) values for both datasets passed the requirements (<0.08) to be an adequate fit at 0.069 and 0.074 for the VCO and CFG datasets. The indices that were on the edge of disqualification are due to the small sample size (VCO $n = 160$, CFG $n = 163$) resulting from strict culling of respondents and response validation.

Table 4. Fit indices for the structural model.

Fit indices	VCO	CFG	Recommended value	Reference
χ^2/df	1.751	1.891	<3	Wheaton <i>et al.</i> [58]
RMSEA(Root Mean Square Error of Approximation)	0.069	0.074	<0.08	MacCallum <i>et al.</i> [59]
CFI (Comparative Fit Index)	0.926	0.914	>0.9	Jöreskog and Sörbom [60]
IFI (Incremental Fit Index)	0.928	0.915	>0.9	Fornell and Larcker [61]

As the data for both VCO and CFG was collected via a single method (survey), we performed a Harman's single factor analysis to determine if method bias was affecting our model's results. The results showed that 36.5% and 41.0% of variance were explained by a single factor for VCO and CFG respectively, indicating unsatisfactory fit of the single factor. As such, it could be said that common method variance is not a consequential issue in our dataset.

5.3. Testing the Hypotheses

The results of hypothesis testing are summarized in Table 5. Echoing the findings of Carrus *et al.* [29], Venkatesh *et al.*[30], and Perugini and Bagozzi [22], attitude (VCO $\beta = 0.391$, $p < 0.001$; CFG $\beta = 0.546$, $p < 0.001$) and subjective norms (VCO $\beta = 0.475$, $p < 0.001$; CFG $\beta = 0.245$, $p < 0.001$) were found to exert a positive influence on desire, and desire exerting a positive influence on intention (VCO $\beta = 0.946$, $p < 0.001$; CFG $\beta = 0.998$, $p < 0.001$) for both the VCO and CFG programs, supporting H1a,b and H2a–d. Perceived behavioral control does not have a significant influence on desire (VCO $\beta = 0.042$, $p = 0.654$; CFG $\beta = 0.110$, $p = 0.155$) for both the VCO and CFG programs, not supporting H3a,b and reflecting the findings of Whitmarsh and O'Neill [14], Choi and Ritchie [62], and Chen [25].

Table 5. Summary of hypotheses results.

Relations	VCO		CFG	
	Path Coefficient	t-value	Path Coefficient	t-value
KN→AT	0.345 ***	3.420	0.782 ***	7.336
KN→PBC	0.356 ***	4.633	0.798 ***	7.630
SE→AT	0.144	1.556	0.011	0.154
SE→SN	0.336 ***	3.448	0.266 **	2.655
PAE→DE	0.307 ***	3.986	0.110	1.349

Table 5. Cont.

Relations	VCO		CFG	
	Path Coefficient	t-value	Path Coefficient	t-value
NAE→DE	0.048	0.783	0.180 **	2.835
AT→DE	0.391 ***	4.876	0.546 ***	6.346
SN→DE	0.475 ***	6.181	0.245 ***	3.847
PBC→DE	0.042	0.448	0.110	1.422
DE→IN	0.946 ***	12.255	0.998 ***	11.140

Note: KN = knowledge; AT = attitude; PBC = perceived behavioral control; SE = social embeddedness; SN = subjective norm; DE = desire; IN = intention; PAE = positive anticipated emotion; NAE = negative anticipated emotion * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Path coefficient values are unstandardized estimates.

The influence of anticipated emotions on the VCO and CFG programs were examined for differences. Only positive anticipated emotions were found to exert a significant and positive influence on desire for VCO ($\beta = 0.307$, $p < 0.001$), while only negative anticipated emotions were found to exert a significant and positive influence on desire for CFG ($\beta = 0.180$, $p = 0.005$). These findings provide support to H4a and H4b. Positive anticipated emotions also played a significant role in influencing consumers' desire to participate in VCO, while negative anticipated emotions did not. The opposite was found to be true for CFG, where only negative anticipated emotions influenced desire to participate in CFG. These results coincide with the findings of Chen [25], who found only positive anticipated emotions have a significant effect on desire to participate in the VCO program, and Bagozzi and Moore [35], who found that stronger negative emotions led to increased decision to help children in need. In addition, Rippetoe and Rogers [63] found that when negative emotions are aroused in people, they may react by denying that the threat is real. Such a phenomenon is more likely to happen for voluntary carbon offsetting, where the threat of global warming is contested by the public and thus easier to reject; over six in ten people in the 2013 March Gallup Poll stated that they do not consider global warming will seriously threaten them during their lifetimes. On the other hand, children's needs in third world countries is much more widely recognized, as shown by UNICEF's consistent leading amongst UN programs in the amount of donations collected. Given these emotion factors' results, it would be more effective to appeal to consumers in a positive tone for VCO, emphasizing the impact each contribution makes to the environment and less about the fear of damages from climate change. As one of the major interests in this study, the influence of knowledge was examined for the VCO and CFG programs. Results indicate that knowledge has a positive influence on attitude (VCO $\beta = 0.345$, $p < 0.001$; CFG $\beta = 0.782$, $p < 0.001$) and perceived behavioral control (VCO $\beta = 0.356$, $p < 0.001$; CFG $\beta = 0.798$, $p < 0.001$) for both the VCO and CFG programs, supporting H5a–d. However, this influence of knowledge was much weaker for the VCO program compared to the CFG program, thus reflecting the findings of Mair and Jago [46] supporting H6a,b. While knowledge positively influenced the formation of a positive attitude and subjective norm towards both VCO and CFG, the influence of knowledge was found to be much weaker in VCO compared to CFG. This reflects the findings of Polonsky and Garma [45] and Mair and Jago [46]. In light of this, airlines should take a more active approach towards providing clear information on exactly how their monetary donations would contribute in offsetting carbon emission they are responsible for.

Finally, social embeddedness was found to have a positive influence on the subjective norm (VCO $\beta = 0.336$, $p < 0.001$; CFG $\beta = 0.266$, $p = 0.008$) but not attitude (VCO $\beta = 0.144$, $p = 0.120$; CFG $\beta = 0.011$, $p = 0.878$) for both the VCO and CFG programs, partially supporting H7a–d. This supports that individuals with high levels of social embeddedness are more likely to believe other people will also volunteer [50]. As such, the in-flight VCO should be structured so that individuals can see their actions as part of a shared social effort. Perhaps a reasonable approach would be to show the progress made towards offsetting the entire flight as passengers contribute their portion of responsibility. This user-friendly type of sustainability program can encourage consumers to behave in a more environmentally conscious manner.

6. Conclusions

This study sought to understand the driving forces behind sustainable consumption. Prior studies have explored the role of attitudes, perceived behavioral control, and subjective norms, as well as positive and negative emotions. In addition to such internal and emotional factors, we demonstrated how level of knowledge and sense of belongingness impact attitude, subjective norms, and perceived behavioral control to shape consumers' participation in sustainable consumption. These hypothesized relations were empirically tested using the structural equation modeling (SEM).

The results of this research highlight the importance of delivering relevant knowledge and enhancing social belongingness of consumers. Knowledge was found to positively influence the consumer's attitude and perceived behavioral control in sustainable consumption. This demonstrates the airline industry's need to provide more information about the VCO and CFG programs. It is important for airlines to take a more active approach towards providing clear information on exactly how their monetary donations would be used [44]. From this, we could infer that companies pursuing sustainable performance should not focus solely on appealing their green image, but rather provide information demonstrating the effectiveness of consumers' participation [36]. To increase consumer knowledge, we propose practical implementations for sustainability programs. An in-flight advertisement and emission calculator can be designed to increase awareness of the negative impact of air travel on the environment, along with instilling in passengers their sense of responsibility for global environmental protection via positively charged messages. Airlines should also install "donation tally" within this implementation system so that passengers can recognize how a donation would be contributed towards social responsibility.

The consumer's social embeddedness is also found to influence the subjective norm towards CFG participation, and even more strongly for VCO participation. While previous studies postulated the influence of subjective norms on desire [41], they did not suggest antecedent variables for influencing consumers' subjective norm. From an academic standpoint, our results demonstrate that social embeddedness positively influences subjective norms.

Finally, our results demonstrate that different emotional elicitation strategies are need for different sustainability programs. As only positive anticipated emotions positively influenced the desire for VCO, it would be more effective to appeal to consumers in a positive tone for VCO, emphasizing the impact each contribution makes to the environment and less so about the fear of damages from climate change. For CFG, only negative anticipated emotions positively influenced desire. As such, appealing to consumer's guilt and sadness would be an effective method to encourage its participation.

Future research should explore various consumer characteristics such as gender or user flight traits (e.g., flight frequency), and be compared with the results of this study. According to Kalafatis *et al.* [18], varying regional perspectives can influence adoption behavior. Therefore, future studies should be conducted to observe how consumers in the U.S. differ from those in Europe.

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Author Contributions

Yohan Kim contributed to research design, data collection, and writing of the article. Sunyoung Yun contributed to research design, analysis, and interpretation. Joosung Lee contributed to the development of the conceptual framework and interpretation. All authors read and approved the final manuscript.

Appendix

Table A1. Survey Questionnaire (VCO).

Construct	Questions	Reference
Knowledge	(Not at all—Very well)	McEachern and Warnaby [41]
	I could explain the consequences of climate change to humanity	
	I could explain how VCO works in addressing relevant problems	
	I could explain how I can participate in VCO	
Social Embeddedness	(Not at all—Definitely true)	Kurz <i>et al.</i> [47]
	I am involved in a community in which I have a strong sense of belongingness and attachment to	
	In my community, I often interact and discuss about environmental concerns	
	I have an extensive network within my community with whom I see or talk to once or week or more often	
	I feel that I am well included within the key communities that I am involved in	
Attitude	(Strongly agree—Strongly disagree)	Casaló <i>et al.</i> [53]
	Overall, participating in VCO would be good for humankind	
	Participating in VCO is a wise thing to do for a society	
	Participating in VCO is valuable to the society	
	Participating in VCO is beneficial to the humankind	

Table A1. Cont.

Construct	Questions	Reference
Subjective Norm	(Not at all—Absolutely)	Ajzen [54]
	Most people important to me would think that I should participate in VCO	
	The people in my life whose opinions I value would approve of my participation	
	It is expected of me that I participate in VCO	
Perceived Behavioral Control	(Not at all—Absolutely)	Ajzen [54] Marchekwa <i>et al.</i> [55]
	For me to successfully participate in VCO in my next flight would be easy	
	I have the knowledge necessary to participate in VCO I have the resources necessary to participate in VCO	
Positive Anticipated Emotions	(Strongly disagree—Strongly agree)	Perugini and Bagozzi [22]
	If my participation in VCO successfully achieved its goal of helping the environment, I would feel... Excited/Happy/Satisfied/Proud	
Negative Anticipated Emotions	(Strongly disagree—Strongly agree)	Perugini and Bagozzi [22]
	If my participation in VCO did not achieve its goal of helping the environment, I would feel... Frustrated/Sad/Disappointed	
Desire	(Not at all—Absolutely)	Carrus <i>et al.</i> [29] Perugini and Bagozzi [22]
	I desire to participate in VCO to help the environment	
	My desire to participate in VCO can be described as strong	
	I have a passionate wish to participate in VCO Participating in VCO is something that I want to do	
Intention to participate	(Not at all—Absolutely)	Carrus <i>et al.</i> [29] Casaló <i>et al.</i> [53]
	I intend to participate in VCO next time it is available	
	I will make an effort to participate in VCO next time I get the opportunity	
	I plan to participate in VCO the next opportunity I get I will try to participate in VCO next time it is available	

Table A2. Construct validity (Cronbach's alpha).

Construct	VCO	CFG
KN	0.84	0.86
SE	0.90	0.87
ATT	0.95	0.94
SN	0.78	0.78
PBC	0.83	0.85
PAE	0.88	0.89
NAE	0.90	0.90
DE	0.92	0.92
IN	0.95	0.93

Conflicts of Interest

The authors declare no conflict of interest.

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