Economia agro-alimentare /
Food Economy

*An International Journal on Agricultural and Food Systems*

*Vol. 25, Iss. 3, Art. 5, pp. 109-141 - ISSNe 1972-4802*
*DOI: 10.3280/ecag2023oa15961*

# Unraveling Psychosocial Drivers of Environmentally-labeled Coffee

**Veenarat Ut-tha**[a,b], **Rebecca Chung**[*,b]

[a] Mahidol University, Thailand
[b] National Pingtung University of Science and Technology, Taiwan

## *Abstract*

In Taiwan's niche coffee market, there is a clear demand for sustainability, yet there remains a gap in understanding certification preferences. This study addresses this gap by employing the Theory of Planned Behavior (TPB) to investigate the purchase intentions of 348 Taiwanese consumers towards environmentally-labeled coffee. Structural equation modeling reveals positive associations between attitude, subjective norms, perceived behavioral control individually, and purchase intention. Among the factors influencing attitude, sensory, upscale, and environmental beliefs significantly play significant roles, while health beliefs do not. Probit regression analysis confirms that purchase intention positively influences consumers' willingness to engage in coffee consumption. In additon, consumer characteristics including past experience, household size, knowledge, and age also impact coffee consumption willingness. These findings provide valuable insights for stakeholders seeking to promote sustainable consumption and guiding environmentally-conscious decision-making strategies.

## *Article info*

**Type**:
Article
**Submitted**:
28/05/2023
**Accepted**:
06/12/2023
**Available online**:
05/02/2024

**JEL codes**:
D12, D91, N55

**Keywords**:
Environment
Health
Sensory
Sustainability
Upscale
Theory of
planned behavior

**Managing Editor**:
Catherine Chan

* *Corresponding author*: Rebecca Chung - Department of Tropical Agriculture and International Cooperation - National Pingtung University of Science and Technology - Taiwan, R.O.C. E-mail: rebecca@mail.npust.edu.tw.

## Introduction

The global coffee trade, the largest among tropical beverages, has experienced rapid growth since 2000, holding the potential to support Sustainable Development Goals (SDGs) through income generation and poverty reduction. Rising consumer demand for traceability, transparency, quality, and origin resonates with the prevailing global coffee culture (FAO, 2023). Projections for the 2023/24 season anticipate production at 174.3 million bags, propelled primarily by Brazil and Vietnam, while consumption is expected to reach an unprecedented 170.2 million bags. The increased importation of coffee by the European Union and the United States may lead to constrained ending inventories of 31.8 million bags (Foreign Agricultural Service USDA, 2023).

In the coffee segment, specialty and certified coffees are gaining popularity in niche markets. Certified coffee, exemplified by Fair Trade, addresses issues like child labor, livelihoods, and environmental concerns (Fairtrade International, 2023). Rainforest coffee supports small-scale farmers, sustainability, and biodiversity (Rainforest Alliance, 2021). UTZ certification, now part of the Rainforest Alliance, promotes sustainable farming and environmental protection (Rainforest Alliance, 2023). These certifications ensure eco-friendly production (Barreto Peixoto *et al.*, 2023; Liu *et al.*, 2019a). Specialty coffee, known for unique flavors, often highlights specific origins (Wann *et al.*, 2018). Specialty coffee can be certified to validate its commitment to both sustainability and quality, thereby affirming its exceptional standards (Barreto Peixoto *et al.*, 2023; Ho *et al.*, 2018; Sepúlveda *et al.*, 2016). Embracing these trends empowers Taiwanese consumers to actively support sustainable food systems, in accordance with the Taiwanese Food and Agricultural Education Law (TFAEL) (Huang *et al.*, 2023).

Taiwan's thriving coffee market, which serves an impressive 2.85 billion annual cups annually, experienced a remarkable 20% surge, reaching a total worth of $2.76 billion in 2020 (United States Department of Agriculture, 2021). The government actively promotes specialty coffee through various events and competitions, showcasing its significance with a community of approximately 4,000 coffee roasters. Anticipated growth in imports, primarily from the US, Colombia, and Ethiopia, is attributed to limited local production (United States Department of Agriculture, 2021).

Research on sustainable coffee in Taiwan's specialized market indicates a demand, albeit with limited existing studies. Wann *et al.* (2018) examined local preference for specialty coffee in Taichung, highlighting a preference for café-style experience and distinctive packaging, while highlighting the importance of addressing local demand and environmental concerns. In a study by Liu *et al.* (2019a) involving 568 Taiwanese respondents, traceability and organic certifications emerged as top priorities, with fair-trade ranking lower in

importance. This suggests a need to promote awareness of eco-friendly and fair-trade certifications. This underscores a research gap in understanding certification preferences, particularly in the context of sustainability.

Within the global context, Barreto Peixoto *et al.* (2023) conducted a comprehensive review of sustainability in the coffee industry. They highlighted the challenges arising from the dominance of roasters and major companies, emphasizing the need for coordinated governmental initiatives to tackle transparency and sustainability issues. Gaining insight into the motivation and barriers encountered by consumers of sustainable coffee is pivotal, especially since environmentally-labeled coffee continue to hold significance for eco-conscious consumers.

In light of the above evidences, the present study aims to predict the purchase intention and willingness of Taiwanese consumers to consume environmentally-labeled coffee. To achieve this, the Theory of Planned Behavior (TPB) is employed to gain a comprehensive understanding of consumer attitude, specifically examining how attitude, subjective norm, and perceived behavioral control influence purchase intention. Building on the insights from TPB, the study then integrates purchase intention with demographic factors, coffee knowledge, and past experience. This comprehensive approach aims to more accurately predict the willingness of Taiwanese consumers to consume environmentally-labeled coffee in the final stage. These findings can provide valuable insights for policymakers, guiding potential strategies for the expansion of the environmentally-labeled coffee market in Taiwan. This involves aligning policies with consumer preferences and industry trends, thereby cultivating an environment conducive to producers and retailers, and further enhancing sustainability in this specialized market.

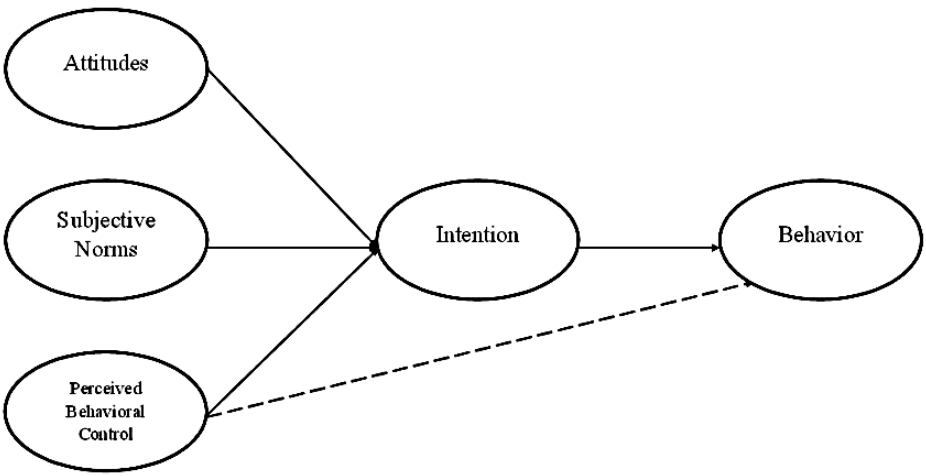
## 1. Theoretical Framework and Hypotheses

### 1.1. *Theory of planned behavior*

The Theory of Planned Behavior (TPB) posits that attitude toward behavior (ATT), subjective norm (SN), and perceived behavioral control (PBC) influence behavioral intention, a key determinant of behavior (Ajzen, 1991; Ajzen & Fishbein, 2000). TPB expands on the Theory of Reasoned Action (TRA) by including PBC, which relates to resource availability for behavior execution (Figure 1) (Ajzen, 1991; Madden *et al.*, 1992). Studies on green consumption have utilized TPB effectively (Chen & Tung, 2014; Halder *et al.*, 2016; Han *et al.*, 2010; Liobikienė *et al.*, 2016). However, TPB has faced criticism for its limited focus and predictive limitations (Ajzen, 1991; Terry *et al.*, 1999). To enhance explanatory power, researchers have integrated

perceived moral obligation and sustainability self-identity into the TPB model (Chen, 2020), while other studies have shown superior explanatory capabilities (Han & Kim, 2010; Han *et al.*, 2011; Heidari *et al.*, 2018; Hoeksma *et al.*, 2017; Paul *et al.*, 2016). This study examines beliefs related to sensory, health, upscale, and environment within a TPB model to predict attitude and purchase intention for environmentally-labeled coffee in Taiwan.

*Figure 1 - Theory of planned behavior*




*Source*: Adapted from Fishbein & Ajzen (1975).

## 1.2. *Hypotheses development*

### 1.2.1. Sensory belief

Previous research highlights the importance of sensory factors, particularly taste and aroma, in shaping the overall coffee experience (Labbe *et al.*, 2015). Taste, smell, and fragrance are identified as primary motives for coffee consumption (Ave *et al.*, 2015; Sousa *et al.*, 2016; Utama *et al.*, 2021), exerting a substantial influencing individuals' attitude and purchase intentions towards coffee (Ave *et al.*, 2015; Utama *et al.*, 2021). Further studies confirm the pivotal role of sensory appeals, encompassing sight, sound, taste, and touch, in driving purchase intentions at coffee establishments (Jang & Lee, 2019). Similarly, Bannor *et al.* (2022) emphasize sensory aspects, particularly taste, in shaping consumer preferences for specialty indigenous chicken products in Ghana. Nevertheless, sensory barriers, such as dissatisfaction

with smell and taste, can impede coffee consumption (Sousa *et al.*, 2016). This study proposes hypotheses regarding the impacts of sensory beliefs, specifically taste and aroma, on attitude and purchase intentions towards environmentally-labeled coffee.

*Hypothesis (H1): Sensory belief affects consumers' attitude towards environmentally-labeled coffee.*

*Hypothesis (H2): Sensory belief affects consumers' purchase intention towards environmentally-labeled coffee.*

### 1.2.2. Health belief

The health benefits of coffee have been extensively studied, with findings indicating positive effects such as migraine reduction (Aguirre, 2016), lowered risks of Parkinson's, Alzheimer's, improved liver function, and weight loss (de Mejia & Ramirez-Mares, 2014). In addition, Singh and Pandey (2018) and Nicolau *et al.* (2020) show that health-conscious individuals tend to favor green packaging and eco-friendly restaurants. Zhang *et al.* (2018) and Bannor *et al.* (2022) establish a link between health concerns to increased purchase intentions and willingness to pay. In the context of environmentally-labeled coffee, the perception of it as "healthy" due to eco-friendly production and chemical-free beans has been shown to cultivate positive attitudes and bolster purchase intentions (Lee *et al.*, 2015). This health-centric effect has been observed in Costa Rica (Aguirre, 2016) and corroborated in Indonesia (Utama *et al.*, 2021). Based on this comprehensive body of evidence, the following hypotheses are put forth:

*Hypothesis (H3): Health belief affects consumers' attitude towards environmentally-labeled coffee.*

*Hypothesis (H4): Health belief affects consumers' purchase intention towards environmentally-labeled coffee.*

### 1.2.3. Upscale belief

"Upscale products" refer to prestigious, high-quality branded items associated with high prices, esteemed reputation, and global recognition (Achabou & Dekhili, 2013; Boulding & Kirmani, 1993; Huang *et al.*, 2014; Ryan & Casidy, 2018; Vraneševic & Stančec, 2003). In this vein, organic

products are closely linked to a luxurious consumer lifestyle in China (Bai *et al.*, 2019). In the context of sustainable coffee, backed by international certifications such as the Voluntary Sustainability Standard Program, environmentally-labeled coffee is perceived as high-quality (Sepúlveda *et al.*, 2016; Ut-tha *et al.*, 2021a) and upscale (Ut-tha *et al.*, 2021b). Ut-tha *et al.* (2021b) also discovered that the upscale image of certified coffee positively influence consumers' attitudes towards purchasing certified coffee in Thailand. Moreover, coffee quality play a significant role in shaping attitudes toward organic coffee purchases (Puspitasari & Balqiah, 2020), while brand reputation exerts influence over product evaluation and purchasing behavior (Ryan & Casidy, 2018). These findings lead to the formation of the following two hypotheses:

*Hypothesis (H5): Upscale belief affects consumers' attitude towards environmentally-labeled coffee.*

*Hypothesis (H6): Upscale belief affects consumers' purchase intention towards environmentally-labeled coffee.*

### 1.2.4. Environmental belief

Environmentally conscious consumers prioritize sustainable products as a means of contributing to environmental protection (My *et al.*, 2018; Petrescu & Petrescu-Mag, 2015; Roitner-Schobesberger *et al.*, 2008). In South Korea, environmental concerns influence attitudes toward purchasing organic coffee (Lee *et al.*, 2015). Existing research on organic products underscores the significant role of the environment in shaping consumer attitudes (Bai *et al.*, 2019; Oroian *et al.*, 2017; Zagata, 2012). Environmental beliefs positively impact purchase decisions and attitudes toward green packaging, as well as willingness to pay a premium (Singh & Pandey, 2018). Higher environmental responsibility correlates with a positive attitude toward green products (Hameed *et al.*, 2019; Shukla, 2019). Key factors in green consumption behavior include environmental concern and knowledge, which significantly influence attitudes, intentions, and green purchasing behavior (Emekci, 2019). Building upon these findings, the following hypotheses are proposed:
*Hypothesis (H7): Environmental belief affects consumers' attitude towards environmentally-labeled coffee.*

*Hypothesis (H8): Environmental belief affects consumers' purchase intention towards environmentally-labeled coffee.*

### 1.2.5. Attitude

Attitude (ATT) comprises beliefs that exert a significant impact on behavioral intention. Extensive research demonstrates that ATT is a robust predictor of pro-environmental behavioral intention (Paul *et al*., 2016; Shi *et al*., 2017; Yadav & Pathak, 2016) as well as purchase intention for sustainably-produced coffee (Ramírez-Correa *et al*., 2020; Van der Merwe & Maree, 2016). Notably, environmentally-labeled coffee, symbolizing green production and consumption, aligns harmoniously with previous literature showing the importance of ATT in green consumerism. Studies by Ruangkanjanases *et al.* (2020), Shukla (2019), Hameed *et al.* (2019), Zhang *et al*. (2018), and Emekci (2019) further underscore the signifcant role of ATT in forming purchase intentions and willingness to pay a premium for eco-friendly products. Thus, a hypothesis is proposed:

*Hypothesis (H9): Attitude towards environmentally-labeled coffee affects consumers' purchase intention towards environmentally-labeled coffee.*

### 1.2.6. Subjective norm

Subjective norms (SN) represent social influences exerted by significant individuals, such as family and friends, on decision-making (Aguirre, 2016). Normative beliefs, which align with SN in TPB, affect behavior (Ajzen, 1991). Shukla (2019) and Hameed *et al.* (2019) demonstrated that SN significantly influenced the intention toward purchase green products and engage in eco-conscious behavior. This implies that perceiving social pressure to buy green products positively affects one's intention. SN reflects cognizance of moral and social norms within social groups, thereby playing a significant role in shaping individuals' intentions to engage in green purchasing behavior. Extensive research conducted in various regions, including Thailand (Ut-tha *et al*., 2021b) and South Africa (Van der Merwe & Maree, 2016), as well as the studies by Emekci (2019) and Liobikienė *et al*. (2016) further validate the crucial role played by SN in pro-environmental actions. This study thus proposes that:

*Hypothesis (H10): Subjective norm affects consumer's purchase intention towards environmentally-labeled coffee.*

### 1.2.7. Perceived behavioral control

Perceived behavioral control (PBC) reflects an individual's belief in their ability to perform a behavior and overcome obstacles (Ajzen, 1991), including

self-control, resource access, and confidence (Kidwell & Jewell, 2003). When individuals perceive control over relevant factors, their likelihood of engaging in behavior increases. In niche markets such as green consumerism, PBC significantly impacts consumer behavior, particularly in specialty coffee consumption (Van der Merwe & Maree, 2016). It consistently associates with purchase intention for green and organic products (O'Connor *et al.*, 2017; Paul *et al.*, 2016). Lee *et al.* (2015) confirmed PBC's impacts, particularly in the case of organic coffee. Ruangkanjanases *et al.* (2020) found that a strong belief in behavioral control leads to increased green consumption. In addition, Shukla (2019) and Hameed *et al.* (2019) emphasize the significant role of PBC in shaping purchase intention of eco-conscious behavior. The proposed hypothesis is that:

*Hypothesis (H11): Perceived behavioral control affects consumer's purchase intention towards environmentally-labeled coffee.*

### 1.2.8. Purchase intention

TPB denoted a significant correlation between intentions and behavior, where stronger intentions lead to a greater likelihood of engaging in that behavior (Ajzen & Driver, 1991). ATT, SN, and PBC collectively shape intentions, ultimately influencing behavior. Hence, intention is a crucial predictor and influencer of actual behavior (Ajzen, 1991). Research on health and consumer behavior demonstrates a significant correlation between willingness to pay premium and intentions (Setyawan *et al.*, 2018). Prior research on price premium intention and willingness to pay more, without affecting decision-making, further support this notion (Salem & Salem, 2018). Emekci (2019) found that intention has a direct effect on green buying behavior, implying that individuals with higher intentions to engage in green buying behavior are more likely to exhibit such behavior. Therefore, intention acts as a mediator between ATT, SN, and PBC, and actual behavior.

### 1.2.9. Coffee consumption willingness

In this study, researchers explore the concept of "coffee consumption willingness" as a behavior construct rooted in the Theory of Planned Behavior (TPB). This construct involves the transition from intention to actual behavior, as proposed by Ajzen (1991). It involves examining the relationship between "purchase intention of environmentally-labeled coffee" and "coffee consumption willingness." While these two concepts are related,

there is a subtle distinction between them. Purchase intention resides within an individual's mind and represents their intention to buy a specific product, serving as a precursor to actual purchasing behavior.

On the other hand, coffee consumption willingness encompasses a state of readiness for various coffee-related activities, including purchasing, brewing, and savoring environmentally-labeled coffee in its various forms. Researchers apply the theoretical framework of the TPB, which posits that human behavior can be predicted by intention. Therefore, in this study, researchers assume that purchase intention can predict an individual's willingness to consume coffee, which we regard as a future behavior. This behavior pertains specifically to coffee consumption.

The term 'willingness' in this context implies a predisposition or inclination to engage in a certain behavior, which, in this case, is the consumption of coffee. Thus, coffee consumption willingness in this study encompasses more than just purchasing; it also includes the state of preparation for various coffee-related activities, such as buying, brewing, and enjoying different forms of eco-labeled coffee.

The primary focus is on "environmentally-labeled coffee," which researchers define as a 250-gram package of roasted coffee beans adorned with eco-friendly labels (e.g., Fair Trade, Rainforest Alliance, UTZ) on its packaging. Researchers presented participants with an image of this coffee and asked them to express their willingness to consume it in the market, with response options of "yes" or "no". Subsequently, researchers subjected the gathered data to further analysis using a probit model. In this model, the dependent variable represents a binary response, with "yes" indicating willingness and "no" denoting the opposite. Based on these findings, researchers propose the following hypothesis:

*Hypothesis (H12): Purchase intention influences coffee consumption willingness regarding environmentally-labeled coffee.*

### 1.2.10. Consumer characteristics

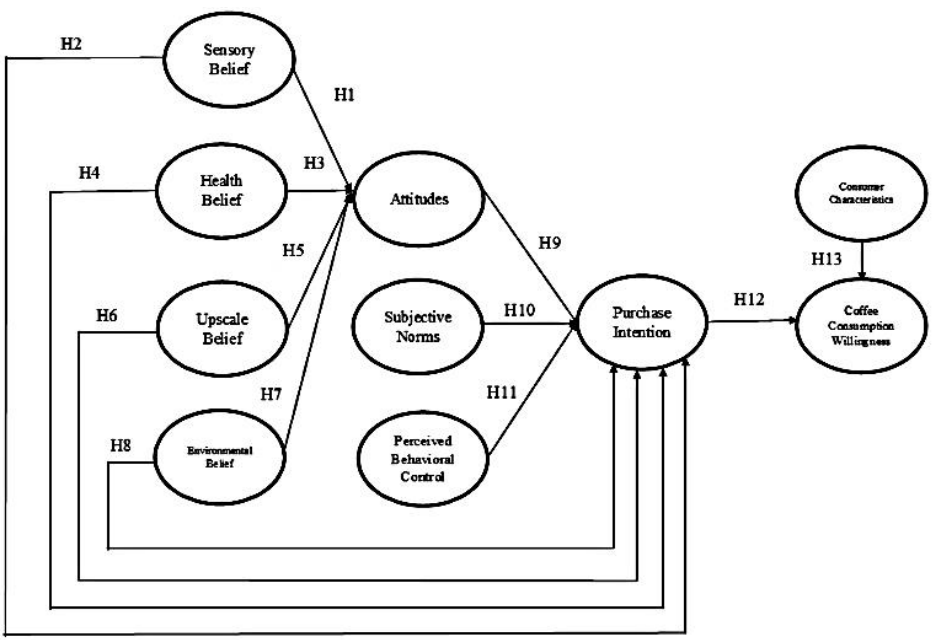
This study extends the TPB model by incorporating additional factors that influence the willingness to consume environmentally-labeled coffee, including sociodemographic characteristics, product knowledge, and past experience. Existing literature indicates that consumer attributes such as knowledge, experience, and demographic variables play a significant role in product purchase decisions (Cerjak *et al.*, 2015; Mohamed *et al.*, 2014). Zhang *et al.* (2018) noted that a deeper understanding of safe vegetables leads to a more positive attitude, and prior experience with online purchases

influences attitude. Ut-tha *et al.* (2021a) discovered that past experience with sustainable coffee positively affects the willingness to pay a premium. Age has been identified as a determinant in preferences for sustainable foods such as indigenous chicken (Bannor *et al.*, 2022), while income has been shown to affect intentions to patronize green restaurants (Nicolau *et al.*, 2020). Extensive literature consistently supports the relationship between demographic variables (e.g., age, gender, income, marital status, job, and education level) and green consumption behavior (Bannor *et al.*, 2022; Iqbal *et al.*, 2022; Nicolau *et al.*, 2020; Ut-tha *et al.*, 2021a; Zhang *et al.*, 2018). This leads to the following hypothesis:

*Hypothesis (H13): Consumer characteristics, including past experience, coffee knowledge, gender, age, marital status, education, job, household size, and household income, influence coffee consumption willingness regarding environmentally-labeled coffee.*

Based upon the theoretical framework and hypotheses outlined above, Figure 2 depicts the research model in this study.

*Figure 2 - Proposed research framework*



## 2. Methodology

### 2.1. *Sample and data collection*

The present study focuses on roasted coffee beans, packaged in 250 g quantities, produced under the guidelines of third-party certification organizations for Voluntary Sustainability Standards (VSS). These programs, such as Fair Trade, organic (e.g., USDA organic, EU organic), Rainforest Alliance, and UTZ certified, have distinct objectives. For example, Fair Trade aims to promote international trade fairness and sustainable development by offering better trading conditions to smallholder farmers (Pedini *et al.*, 2017), while organic prohibits the use of artificially produced substances to maintain ecosystem balance. Rainforest Alliance seeks to promote harmonious coexistence between people and nature, and UTZ certified is based on principles of fairness and transparency (Lentijo & Hostetler, 2011). These diverse certifications share the goal of improving the livelihood of small farmers in developing countries by promoting sustainability in the coffee value chain and commanding premium prices. In short, these environmentally-friendly coffee labels align with the United Nations' Sustainable Development Goal 12. Consumers place a high value on environmentally-labeled coffee production due to their sustainable consumption practices that provide benefits to the local environment and economy (Bray & Neilson, 2017; Grabs *et al.*, 2016; Lentijo & Hostetler, 2011; Pedini *et al.*, 2017).

To achieve its research objectives, this study employs two methodologies: structural equation modeling (SEM) to predict purchase intention (PI) and probit regression to analyze factors influencing coffee consumption willingness, categorized as either "yes" or "no". Hair *et al.* (2018, p. 633) proposed that the minimum sample sizes should take model complexity and essential measurement model attributes into account. Therefore, a minimum sample size of 150 is suggested for models with seven constructs or fewer, communalities of at least .5, with no underidentified constructs. Given that this current study encompasses eight latent constructs, with communalities exceeding 0.5 and devoid of underidentified constructs, researchers consequently chose a sample size of 400 – equally distributed across four counties – to enhance both precision and reliability. Similarly, in the context of probit regression, a type of binary regression, an alternative model form exists that is nearly equivalent. The probit model closely mirrors the logistic model in most cases involving a binary outcome variable, and its advantages becoming more evident when extending the model to a multi-category outcome measure. To achieve optimal results with maximum likelihood estimation, an overall sample size of 400 is recommended (Hair *et al.*, 2018,

p. 557). To this end, researchers employed a stratified sampling method for allocating a total of 400 samples and set a quota of 100 respondents equally across four counties (Taipei, Taichung, Kaohsiung, and Pingtung). This approach was adopted to enhance both accuracy and reliability.

The data collection was then conducted during January-February 2022 using purposive sampling, targeting individuals aged 18 years and over who regularly drink coffee and reside near coffee shops and supermarkets. Due to the data collection being carried out during the Covid-19 pandemic, a self-administered survey questionnaire was deemed appropriate, taking into consideration the need for social distancing. The survey instrument utilized in this study comprises of three distinct sections. The first section, containing a total of 26 items (Table 3), is intended to assess the constructs of the extended Theory of Planned Behavior (TPB) model, including sensory belief, health belief, upscale belief, environmental belief, attitude, subjective norm, perceived behavioral control, and purchase intention. Respondents rate each item on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The second section is designed to inquire about coffee knowledge, coffee experience, and willingness to consume environmentally-labeled coffee. The third section collects demographic data, including gender, age, marital status, education, occupation, household size, and income. Before the final survey administration, a pre-test was conducted to enhance questionnaire clarity and reduce bias. Out of 400 questionnaires distributed, a total of 348 fully completed and coded questionnaires were utilized for analysis, resulting in a response rate of 87%.

After questionnaires were returned, researchers assessed the correlation results among the explanatory variables used in probit regression, including purchasing intention, past experience, knowledge of environmentally-labeled coffee, gender, age, marital status, education, occupation, household size, and household income. According to Hair *et al.* (2018, p. 578), calculating binary correlations among the independent variables and observing any bivariate correlation of 0.50 or greater suggests the potential for multicollinearity problems. A correlation coefficient with an absolute value greater than 0.7 generally indicates a substantial correlation between predictor variables. In this study, researchers observed that knowledge exhibits a positive and significant correlation with past experience (heard) (0.62*), while marital status is positively and significantly correlated with age (0.60*), albeit not surpassing the 0.7 threshold. It is reasonable to deduce that individuals with knowledge of environmentally-labeled coffee may have heard about it, although they might not always make purchases. Conversely, individuals with past experience may have heard about and purchased this coffee before. Therefore, researchers have concluded that there is no multicollinearity issue with the explanatory variables, and consequently, we proceeded to utilize these variables in the probit model.

This study analyzed participant demographics (Table 1). The gender distribution was nearly equal, with 50.57% male and 49.43% female. Most respondents fell in the 18-35 age group (64.37%), while 35.63% were in the 36-65 age group. Relationship status showed 67.53% as single and 32.47% with other statuses. Education-wise, 57.47% held a bachelor's degree or lower, and 42.53% had a master's degree or higher. Employment status revealed 88.22% were employed full-time including university students, while 11.78% were retired, self-employed, or housewives/househusbands. Household size was larger for 66.38% of participants and smaller for 33.62%. In terms of monthly household income, 55.17% reported TWD 60,000 or lower, and 44.83% had an income of TWD 60,000 or higher.

*Table 1 - Sociodemographic characteristics of the respondents*

| **Variables** | **Description** | **Overall sample** | | |
|---|---|---|---|---|
| | | **Frequency (%)** | **Mean** | **SD.** |
| *Gender* | 1 = Male | 176 (50.57) | 0.49 | 0.50 |
| | 0 = Female | 172 (49.43) | | |
| *Age* | 1 = Senior (36-65 years) | 124 (35.63) | 0.49 | 0.50 |
| | 0 = Non-senior (18-35 years) | 224 (64.37) | | |
| *Status* | Marital status | | | |
| | 1 = Single | 235 (67.53) | 0.68 | 0.47 |
| | 0 = Others | 113 (32.47) | | |
| *Edu* | Educational level | | | |
| | 1 = Master degree or higher | 148 (42.53) | 0.43 | 0.49 |
| | 0 = Bachelor degree or lower | 200 (57.47) | | |
| *Job* | Occupation | | | |
| | 1 = Work full-time outside home and student | 307 (88.22) | 0.88 | 0.32 |
| | 0 = Other (retired, self-employed, housewife/househusband) | 41 (11.78) | | |
| *Size* | Household size | | | |
| | 1 = Small size (3 members or lower) | 117 (33.62) | 0.34 | 0.47 |
| | 0 = Large size (4 members or higher) | 231 (66.38) | | |
| *Income* | Household income | | | |
| | 1 = TWD 60,000 or higher | 156 (44.83) | 0.45 | 0.49 |
| | 0 = Less than TWD 60,000 | 192 (55.17) | | |
| n = 348 | | | | |

*Source*: Author's computation.

Table 2 shows the coffee consumption willingness regarding environmentally-labeled coffee. Out of 348 respondents, 78.16% (n = 272) expressed a willingness to engage in environmentally-labeled coffee consumption, while 21.84% (n = 76) declined. Among the participants, 69.25% (n = 241) reported previous exposure to environmentally-labeled coffee. Regarding coffee knowledge, 53.74% (n = 187) demonstrated familiarity.

## 2.2. *Measures and tools of analysis*

### 2.2.1. Confirmatory factor analysis and structural equation modeling

This study adopts eight latent constructs from previous studies (Table 3) (Chen & Tung, 2014; Huang *et al*., 2014; Lee & Yun, 2015; Liu *et al*., 2019b; Oroian *et al*., 2017; Paul *et al*., 2016; Petrescu & Petrescu-Mag, 2015; Ut-tha *et al*., 2021a; Wee *et al*., 2014; Yadav & Pathak, 2016; Zagata, 2012). Descriptive statistics indicate high reliability (Cronbach's alpha > 0.70) and mean scores ranging from 3.52 to 4.23. Confirmatory factor analysis (CFA) in AMOS 22 assesses convergent and discriminant validity. Structural equation modeling (SEM) analyzes relationships within the extended TPB model, while probit regression in Stata15 explores factors influencing the coffee consumption willingness.

*Table 2 - Coffee consumption willingness regarding environmentally-labeled coffee*

| **Variables** | **Description** | **Overall sample** | | |
|---|---|---|---|---|
| | | **Frequency (%)** | **Mean** | **SD.** |
| *Heard* | Having heard or bought environmentally-labeled coffee before | | | |
| | 1 = Yes | 241 (69.25) | 0.69 | 0.46 |
| | 0 = No | 107 (30.75) | | |
| *Knowledge* | Having background knowledge of environmentally-labeled coffee | | | |
| | 1 = Yes | 187 (53.74) | 0.54 | 0.49 |
| | 0 = No | 161 (46.26) | | |
| *CCW (Coffee consumption willingness)* | Willing to engage in environmentally-labeled coffee consumption | | | |
| | 1 = Yes | 272 (78.16) | 0.45 | 0.49 |
| | 0 = No | 76 (21.84) | | |
| n = 348 | | | | |

*Source*: Author's computation.

*Table 3 - Descriptive statistic and reliability of variables*

| Constructs/Measurement items | Mean | SD | Cronbach's Alpha Value | Source |
|---|---|---|---|---|
| **Sensory belief (SB)**<br>SB1: I believe that environmentally-labeled coffee tastes good.<br>SB2: I believe that environmentally-labeled coffee has greater aroma. | 3.93 | 0.74 | 0.78 | Lee & Yun (2015); Oroian *et al.* (2017); Zagata (2012) |
| **Health belief (HB)**<br>HB1: I believe that consuming environmentally-labeled coffee keeps me healthier than non-environmentally-labeled coffee.<br>HB2: I believe that consuming environmentally-labeled coffee is safer than non-environmentally-labeled coffee. | 4.01 | 0.86 | 0.94 | Lee & Yun (2015); Petrescu & Petrescu-Mag (2015); Wee *et al.* (2014) |
| **Upscale belief (UB)**<br>UB1: I believe that environmentally-labeled coffee is synonymous with great quality.<br>UB2: I believe that environmentally-labeled coffee has a respectable reputation.<br>UB3: I believe that environmentally-labeled coffee has achieved global recognition. | 4.23 | 0.70 | 0.89 | Huang *et al.* (2014); Ut-tha *et al.* (2021a) |
| **Environmental belief (ENB)**<br>ETB1: I believe that the production process of environmentally-labeled coffee plays a crucial role in protecting the soil, air, water, and food supply from contamination and pollution.<br>ETB2: I believe that the production process of environmentally-labeled coffee demonstrates a higher level of environmental friendliness. | 4.04 | 0.62 | 0.81 | Ut-tha *et al.* (2021b); Wee *et al.* (2014) |
| **Attitude (ATT)**<br>ATT1: Purchasing environmentally-labeled coffee is right thing to do.<br>ATT2: Purchasing environmentally-labeled coffee is pleasant.<br>ATT3: Purchasing environmentally-labeled coffee is desirable.<br>ATT4: Purchasing environmentally-labeled coffee is favorable. | 4.15 | 0.56 | 0.95 | Chen & Tung (2014); Ut-tha *et al.* (2021a); Yadav & Pathak (2016) |

*Table 3 - Continued*

| Constructs/Measurement items | Mean | SD | Cronbach's Alpha Value | Source |
|---|---|---|---|---|
| **Subjective Norm** (**SN**)<br>SN1: Most people who are important to me think that I should purchase environmentally-labeled coffee.<br>SN2: Most people who are important to me and significant others purchase environmentally-labeled coffee.<br>SN3: Government policies and media promotion would lead me to purchase environmentally-labeled coffee. | 3.52 | 0.85 | 0.89 | Paul *et al.* (2016); Ut-tha *et al.* (2021a); Yadav & Pathak (2016) |
| **Perceived Behavioral Control** (**PBC**)<br>PBC1: For me, to purchase environmentally-labeled coffee is easy.<br>PBC2: For me, to purchase environmentally-labeled coffee is the thing I usually do.<br>PBC3: For me, to purchase environmentally-labeled coffee is under my control.<br>PBC4: I can find all information needed to purchase environmentally-labeled coffee.<br>PBC5: I have resources, time, and opportunities to purchase environmentally-labeled coffee when shopping. | 4.00 | 0.79 | 0.99 | Chen & Tung (2014); Ut-tha *et al.* (2021b) Yadav & Pathak (2016) |
| **Purchase Intention** (**PI**)<br>PI1: I intend to purchase environmentally-labeled coffee.<br>PI2: I would purchase environmentally-labeled coffee if it is possible.<br>PI3: I would purchase environmentally-labeled coffee in the near future.<br>PI4: I plan to purchase environmentally-labeled coffee on a regular basis.<br>PI5: I will recommend others to purchase environmentally-labeled coffee. | 4.22 | 0.84 | 0.99 | Chen & Tung (2014); Ut-tha *et al.* (2021a); Wee *et al.* (2014) |

### 2.2.2. Probit model

This study delves into actual consumer behavior, specifically examining their willingness to consume environmentally-labeled coffee, based on the Theory of Planned Behavior (TPB). Participants were asked to indicate their readiness to consume a 250-gram package of environmentally-labeled coffee, bearing certifications such as Fair Trade, Rainforest Alliance, UTZ, etc., if such products were available in the market. If respondents answered "yes," it indicated a higher likelihood of their willingness to partake in coffee consumption resulting from a one-unit increase in the individual independent variable. The primary focus centered on binary responses ("yes" or "no") as predictive indicators of behavior.

The probit model, commonly used in similar studies (Bannor *et al.*, 2022; Yang *et al.*, 2022), was adopted for probability prediction.

$$Yi = \alpha + \beta x + \varepsilon \tag{1}$$

The dependent variable, denoted as $Y$, is a binary response ($Y = 1$ if yes; $Y = 0$ if no), indicating whether a respondent is inclined to consume environmentally-labeled coffee or not. In Equation (1), $Yi$ stands for the dependent variable, and $x$ represents the independent variables. $\beta$ denotes the regression coefficient and $\varepsilon$ is the error term following a normal distribution. $Yi$ can have two outcomes: 1 indicating a willingness to engage in consumption of environmentally-labeled coffee, and 0 representing the contrary choice.

The probit model (Equation 2) specifies a conditional probability using the standard normal distribution ($F(x'\beta)$). Predicted probabilities range from 0 to 1. Equation 2 formulates the probability in the probit model.

$$F(x'\beta) = \Phi(x'\beta) = \int_{-\infty}^{x'\beta} \Phi\left(z\right) dz \tag{2}$$

The model coefficients are determined using the maximum likelihood method, where the log-likelihood is maximized, as expressed by Equation (3):

$$\log = yF(x'\beta) + (1-y)\left[1 - F(x'\beta)\right] \tag{3}$$

To gain a probability-based understanding of the independent variables, the marginal effects can be calculated. These effects reveal the proportional change in the probability of the dependent variable ($Y = 1$) resulting from a unit change in an independent variable ($x$). The marginal effects for the probit model can be represented by Equation (4):

(4) $$\partial\rho / \partial x_j = \Phi(x'\beta)\beta_j$$

Significant estimated parameters and marginal effects in the probit model indicate the importance of independent variables. Further investigation and explanation are warranted for these significant factors.

3.2.3. Predicting coffee consumption willingness among consumers

This study proposes a model to predict the coffee consumption willingness (CCW) regarding environmentally-labeled coffee. In addition, the influencing factors, including purchase intention, past experience, knowledge, gender, age, marital status, education, occupation, household size, and household income are scrunitized. The model is represented as equation (5).

(5) $$P(Y = 1 / Xi) = G(\beta_0 + \beta_1 PI + \beta_2 Heard + \beta_3 Knowledge + \beta_4 Gender + \beta_5 Age + \beta_6 Status + \beta_7 Edu + \beta_8 Job + \beta_9 Size + \beta_{10} Income) = G(x\beta)$$

## 3. Results

### 3.1. *Measurement validation*

To evaluate the measurement model's construct validity, convergent and discriminant validity are examined. For convergent validity, significant standardized factor loadings (ranging from 0.65 to 0.99) on their posited indicators, with an average variance extracted (AVE) of 0.5 or higher are required. In this study, all AVE values are above 0.5, and all construct reliability (CR) values are greater than 0.7, confirming convergent validity. Discriminant validity is assessed by comparing the AVE of any two constructs with their squared correlation estimate. The results show that the diagonal AVE values are higher than the squared inter-construct correlations, providing strong evidence for discriminant validity (Hair *et al.*, 2019).

A set of indicators is applied to assess the accuracy of a measurement model. When sample sizes exceed 250, a significant chi-square statistic ($\chi^2(269\ df) = 482.689$, $p < 0.001$) is acceptable (Hair *et al.*, 2018). The rate $\chi^2/df$ obtained from the study ($\chi^2/df = 1.794$) is below the recommended threshold of five, indicating a good fit (Maichum *et al.*, 2016). Additionally, the goodness-of-fit index (GFI) is acceptable (0.907) (Ting *et al.*, 2019), and other indices meet or exceed the required threshold values, such as 0.982 for the comparative fit index (CFI), 0.979 for the Tucker-Lewis index (TLI),

0.961 for the normalized fit index (NFI), and 0.953 for the relative fit index (RFI); all are above the common required threshold of 0.90 (Maichum *et al.*, 2016; Nguyen *et al.*, 2019). Furthermore, the values of parsimonious normed fit index (PNFI) and parsimonious comparative fit index (PCFI) are above the recommended level of 0.5 (0.795 and 0.813, respectively) (Nguyen *et al.*, 2019).The root mean squared error of approximation (RMSEA) of 0.048 is below the critical level of 0.80 (Ting *et al.*, 2019). These findings collectively suggest that the model is well-fitted (Table 4).

### 3.2. *Testing of the structural equation model*

Once a satisfactory measurement model is obtained, a structural model is estimated to examine the hypotheses underlying the extended TPB model. For sample sizes greater than 250 (N > 250), a statistically significant $\chi^2$ ($\chi^2$ = 570.065; $df$ = 276; $p < 0.001$) is acceptable (Hair *et al.*, 2018). The rate $\chi^2/df$ ($\chi^2/df$ = 2.065) is within the good fit condition (Maichum *et al.*, 2016; Senger *et al.*, 2017). GFI is 0.892, surpassing the critical threshold of 0.8, thus deemed an acceptable level (Ting *et al.*, 2019). The CFI, TLI, NFI, and RFI, which are 0.976, 0.971, 0.954, and 0.946, respectively, exceed the common threshold of 0.90, indicating a good fit (Maichum *et al.*, 2016; Nguyen *et al.*, 2019). Furthermore, the PNFI and PCFI values of 0.810 and 0.828, respectively, are higher than the general threshold of 0.5, indicating a good fit (Maichum *et al.*, 2016; Nguyen *et al.*, 2019). The RMSEA value of 0.055 demonstrates an acceptable level of close fit (Ting *et al.*, 2019). Consequently, the validation of these structures indicates a relatively good fit of the proposed theoretical models to the underlying data (Table 4).

### 3.3. *Hypotheses testing*

Based on the proposed paths depicted in Figure 3, the findings confirm that sensory belief (SB) is significantly and positively associated with attitude towards environmentally-labeled coffee (ATT), supporting hypothesis H1 ($\beta$ = 0.18**). However, SB does not exhibit a significant influence on purchase intention (PI), thus hypothesis H2 is rejected. Health belief (HB) does not significantly predict ATT, indicating rejection of hypothesis H3. Similarly, HB does not significantly affect PI, and hypothesis H4 is also rejected. Upscale belief (UB) positively impacts ATT, providing support for hypothesis H5 ($\beta$ = 0.13*). However, UB does not significantly affect PI, and hypothesis H6 is rejected. Environmental belief (EB) positively influences ATT, providing support for hypothesis H7 ($\beta$ = 0.13*). However, EB is not

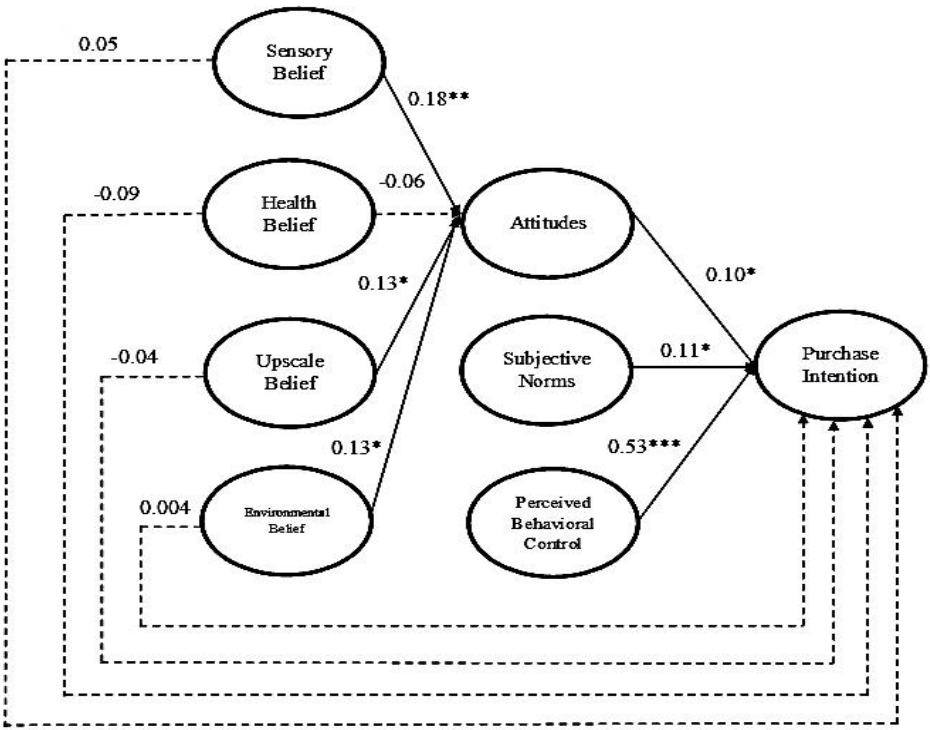
significantly associated with PI, indicating rejection of hypothesis H8. Finally, ATT, subjective norm (SN), and perceived behavioral control (PBC) are all significantly and positively associated with PI, supporting hypothesis H9 ($\beta$ = 0.10*), hypothesis H10 ($\beta$ = 0.11*), and hypothesis H11 ($\beta$ = 0.53***), respectively.

*Table 4 - Goodness-of-fit results in confirmatory factor analysis and structural equation modeling*

| Indicators | Ideal Value | Confirmatory Factor Analysis (CFA) | | Structural Equation Modeling (SEM) | | References |
|---|---|---|---|---|---|---|
| | | Results | Judgement | Results | Judgement | |
| Chi-square ($\chi^2$) | P > .05 | 482.689 (P < .001) | Significant p-values expected (N > 250) | 570.065 (P < .001) | Significant p-values expected (N > 250) | Hair *et al.* (2018) |
| $\chi^2$/df | < 5 (acceptable fit) | 1.794 (482.689/269) | Acceptable fit | 2.065 (570.065/276) | Acceptable fit | Maichum *et al.* (2016); Senger *et al.* (2017) |
| GFI | > 0.9 (good fit) 0.8 - 0.89 (acceptable fit) | 0.907 | Good fit | 0.892 | Acceptable fit | Ting *et al.* (2019) |
| CFI | > 0.9 | 0.982 | Good fit | 0.976 | Good fit | Maichum *et al.* (2016); Nguyen *et al.* (2019) |
| TLI | > 0.9 | 0.979 | Good fit | 0.971 | Good fit | |
| NFI | > 0.9 | 0.961 | Good fit | 0.954 | Good fit | |
| RFI | > 0.9 | 0.953 | Good fit | 0.946 | Good fit | |
| PNFI | > 0.5 | 0.795 | Good fit | 0.810 | Good fit | |
| PCFI | > 0.5 | 0.813 | Good fit | 0.828 | Good fit | |
| RMSEA | < 0.05 (close fit) 0.05 - 0.08 (fair fit) 0.08 - 0.10 (mediocre fit) > 0.10 (poor fit) | 0.048 | Close fit | 0.055 | Fair fit | Ting *et al.* (2019) |

*Source*: Author's computation.

*Figure 3 - The results of the research model*




*Note 1 - * p < 0.05; ** p < 0.01; *** p < 0.001*
*Note 2 - "-" indicates significance; "---" indicates insignificance*

### 3.4. *Predicting the coffee consumption willingness*

The results of probit regression analysis supported hypothesis H12, demonstrating that purchase intention significantly and positively influenced coffee consumption willingness (CCW) regarding environmentally-labeled coffee. Hypothesis H13 received partial support, revealing significant positive effects of variables such as past experience, product knowledge, age, and household size on coffee consumption willingness (CCW). The model exhibited a satisfactory fit. The results revealed that the probability of CCW increased by 14.26% for a one-unit increase in purchase intention. Moreover, the probability of CCW increased by 23.72%, 12.49%, 11.90%, and 11.50% with a one-unit increase in past experience, household size, product knowledge of environmentally-labeled coffee, and age, respectively (Table 5).

*Table 5 - Predicting the coffee consumption willingness regarding environmentally-labeled coffee*

| Variables | Probit | | |
|---|---|---|---|
| | **Marginal effects** | **Coef.** | ***t*-value** |
| Purchase intention (PI) | 0.1426 | 0.69 | 4.41*** |
| Past experience (Heard) | 0.2374 | 0.95 | 4.21*** |
| Background knowledge of environmentally-labeled coffee (Knowledge) | 0.1190 | 0.56 | 2.46* |
| Gender | -0.0267 | -0.13 | -0.69 |
| Age | 0.1150 | 0.61 | 2.21* |
| Marital status (Status) | 0.0437 | 0.20 | 0.74 |
| Education (Edu) | 0.0189 | 0.09 | 0.45 |
| Occupation (Job) | -0.0487 | -0.27 | -0.69 |
| Household size (Size) | 0.1249 | 0.69 | 2.77** |
| Household income (Income) | 0.0054 | 0.03 | 0.13 |
| Number of obs = 348<br>Log likelihood = -118.14112<br>LR chi2(11) = 129.02 (.000)***<br>Pseudo R2 = 0.3532<br>Correctly classified (%) = 83.62%<br>Hosmer and Lemeshow test = 0.1165 | | | |

*Note*: *,**, and *** indicate $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.
*Source*: Author's computation.

## 4. Discussion and Conclusions

This study explores factors influencing Taiwanese consumers' intention to purchase environmentally-labeled coffee. It examines how attitude, subjective norms, and perceived behavioral control serve as predictors of this intention. Additionally, the study investigates the role of sensory, health, upscale, and environmental beliefs in shaping attitudes and purchase intention. Furthermore, it analyzes the relationship between purchase intention, consumer characteristics, and coffee consumption willingness.

The study shows that a positive attitude significantly influences Taiwanese consumers' intention to purchase environmentally-labeled coffee, aligning with similar findings observed by Ut-tha *et al.* (2021b) in Thailand. This trend of positive attitudes driving green purchase intention is corroborated

by research conducted by Ruangkanjanases *et al.* (2020) in Taiwan, Shukla (2019) in India, Hameed *et al.* (2019) in Pakistan, Zhang *et al.* (2018) in China, and Emekci (2019) in Turkey. Collectively, these studies emphasize the substantial impact of positive attitudes on green purchase intention, highlighting that favorable attitudes consistently boost consumers' likelihood of making environmentally-friendly purchases.

This study focused on Taiwan highlights the factors that shape consumer attitudes towards environmentally-labeled coffee, with particular emphasis on sensory beliefs such as taste and aroma, which aligns with the Theory of Planned Behavior. Similar findings were observed in an Indonesian study by Utama *et al.* (2021), emphasizing the significant role of taste and aroma in shaping coffee-related attitudes. Moreover, the study indicates that upscale beliefs, which associate environmentally-labeled coffee with quality and prestige, have a positive impact on attitudes. This aligns with similar findings drawn from research conducted in Thailand by Ut-tha *et al.* (2021b).

In Taiwan, environmental beliefs exert a significant impact on attitudes toward environmentally-labeled coffee, consistent with findings in other regions. Singh and Pandey (2018), Shukla (2019), Hameed *et al.* (2019), and Emekci (2019) all observed the positive influence of environmental concerns on attitudes and purchase decisions across various countries. Notably, in this study, health beliefs did not directly affect attitudes and purchase intentions, different from previous research. Instead, sensory beliefs, particularly those related to taste and aroma, emerged as the most influential factors in shaping attitudes. Therefore, their critical role in marketing environmentally-labeled coffee to Taiwanese consumers cannot be overlooked.

In general, prior research consistently demonstrates that attitudes tend to be more predictive of purchase intention than subjective norms. This is evident in studies such as Ramirez-Correa's (2020) research on specialty coffee in Brazil, Ruangkanjanases *et al.*'s (2020) study on environmentally-friendly products, Ut-tha *et al.*'s (2021b) study on certified coffee in Thailand, and Hoeksma *et al.*'s (2017) investigation into consumers' intentions to purchase meat from mobile slaughter units in the Netherlands.

This study in Taiwan yielded slightly different results, with subjective norms exhibiting slightly higher predictive power than attitude, contrasting with prior findings. This aligns with research by Shukla (2019) and Emekci (2019), emphasizing subjective norms' greater influence on purchase intentions, particularly among millennial Indian and Turkish consumers. These results suggest that individuals feeling social pressure for environmentally-conscious behavior are more likely to have stronger intentions for green purchases. This outcome is consistent with research by Hameed *et al.* (2019), where subjective norms significantly predicted eco-

conscious behavior among Pakistani consumers, underscoring the role of subjective norms in guiding environmentally responsible behavior.

This study reveals a significant and positive association between perceived behavioral control (PBC) and the intention to purchase environmentally-labeled coffee among Taiwanese consumers, aligning with extensive literature. Ruangkanjanases *et al.* (2020) and Shukla (2019) found that PBC positively affect purchase intentions for green products in Taiwan and India, respectively. These findings suggest that when consumers feel a greater sense of control over their environmentally-friendly purchases, it strengthens their intention to make such choices. Notably, this study highlights PBC as the most influential predictor of purchase intention for environmentally-labeled coffee in Taiwan. This finding is consistent with recent studies in South Africa, where PBC demonstrated the highest predictive power concerning the intention to consume specialty coffee (Van der Merwe & Maree, 2016), as well as the intention to opt for organic coffee among consumers in Indonesia (Khaliqi *et al.*, 2021). These results underscore consumers' confidence in their ability to gather information, allocate time, and manage finances for such purchases. They emphasize the pivotal role of perceived behavioral control in driving actual purchase behavior.

When examining coffee consumption willingness, which reflects actual behavior according to the theory of planned behavior, this research highlights that purchase intention significantly and positively influences coffee consumption willingness regarding environmentally-labeled coffee among Taiwanese consumers. This finding is in line with Emekci (2019), who emphasizes the direct impact of intention on green buying behavior in Turkey. It suggests that individuals with higher intentions to engage in environmentally-labeled coffee purchases are more likely to manifest such consumption behavior. Consequently, intention serves as a mediator between attitude, subjective norm, perceived behavioral control, and coffee consumption willingness among Taiwanese consumers.

Consumer characteristics, including knowledge and past experience, significantly influence Taiwanese consumers' coffee consumption willingness. Zhang *et al.* (2018) found that informed Chinese consumers with prior online vegetable purchase experience exhibited positive attitudes and willingness to pay a premium. Similarly, Iqbal *et al.* (2022) noted that knowledge and education level affect preferences, particularly for hygienic tetra pack milk in Pakistan. Age also emerges as a factor, as older consumers in Ghana show a preference for indigenous foods like chicken (Bannor *et al.*, 2022). Furthermore, household size demonstrates a positive correlation with coffee consumption willingness in Taiwan, where larger households exhibit a higher likelihood of engaging in coffee consumption.

These findings have significant implications for promoting sustainable coffee consumption in alignment with United Nations Sustainable Development Goal (SDG) 12. Stakeholders in the coffee industry, including producers, marketers, and policymakers, can utilize these insights to advance sustainable practices and consumer choices. By implementing tailored practices and marketing strategies that emphasize sensory profiles, upscale packaging, and environmental labels, they can effectively engage consumers. Furthermore, collaboration with influencers and public agencies in strategic marketing campaigns can raise awareness among the public. Moreover, leveraging purchase intention and consumer traits as targeting tools through education can positively influence behavior. Additionally, policymakers can play a crucial role in this endeavor by refining certification programs to support sustainable coffee production. Lastly, offering diverse retail choices and conducting educational campaigns that cater to various preferences can significantly shape consumer choices in favor of sustainability.

Building upon these implications, the research findings contribute significantly to existing knowledge in the field. They reaffirm that positive attitudes drive green purchase intention, aligning with global findings. Researchers explore factors shaping consumer attitudes, including sensory beliefs, upscale perceptions, and environmental concerns. Subjective norms exhibit higher predictive power than attitudes for green purchase intention in Taiwan, highlighting social pressures' role. Perceived behavioral control is the most influential predictor, emphasizing consumers' confidence in making eco-conscious choices. Moreover, purchase intention mediates the relationship between attitudes, subjective norms, perceived behavioral control, and coffee consumption willingness. Demographic factors such as knowledge, past experience, age, and household size significantly influence coffee consumption willingness. In conclusion, this study advances understanding and provides practical insights into eco-conscious choices among Taiwanese consumers, contributing to sustainable consumption knowledge.

In recognizing the study's limitations, it's important to note that the data collection occurred during the challenging context of the Covid-19 pandemic, potentially introducing disruptions and influencing consumer behavior due to lockdowns and economic uncertainties. To address this, future research should validate these current findings in post-pandemic conditions. Another limitation is the data's geographic scope, limited to four counties in Taiwan, potentially not capturing the entirety of the environmentally-labeled coffee market. Expanding research to encompass more regions would provide a more comprehensive understanding. Additionally, potential response bias and self-reporting bias are inherent in survey-based research, even with anonymity measures. Future studies may consider qualitative methods or complementary data sources for validation.

## References

Achabou, M.A., & Dekhili, S. (2013). Luxury and sustainable development: Is there a match?. *Journal of Business Research*, *66*, 1896-1903. doi: https://doi.org/10.1016/j.jbusres.2013.02.011.

Aguirre, J. (2016). Culture, health, gender and coffee drinking: A costa rican perspective. *British Food Journal*, *118*, 150-163. doi: https://doi.org/10.1108/BFJ-08-2015-0298.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179-211. doi: https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: An application of the theory of planned behavior. *Leisure sciences*, *13*, 185-204. doi: https://doi.org/10.1080/01490409109513137.

Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology*, *11*, 1-33. doi: https://doi.org/10.1080/14792779943000116.

Ave, S.D., Venter, M., & Mhlophe, B. (2015). Sensory branding and buying behavior in coffee shops: A study on generation y. *The Retail and Marketing Review*, *11*, 93-110.

Bai, L., Wang, M., & Gong, S. (2019). Understanding the antecedents of organic food purchases: The important roles of beliefs, subjective norms, and identity expressiveness. *Sustainability*, *11*, 3045. doi: https://doi.org/10.3390/su11113045.

Bannor, R.K., Abele, S., Kuwornu, J.K., Oppong-Kyeremeh, H., & Yeboah, E.D. (2022). Consumer segmentation and preference for indigenous chicken products. *Journal of Agribusiness in Developing and Emerging Economies*, *12*, 75-93. doi: https://doi.org/10.1108/JADEE-08-2020-0162.

Barreto Peixoto, J.A., Silva, J.F., Oliveira, M.B.P., & Alves, R.C. (2023). Sustainability issues along the coffee chain: From the field to the cup. *Comprehensive Reviews in Food Science and Food Safety*, *22*, 287-332. doi: https://doi.org/10.1111/1541-4337.13069.

Boulding, W., & Kirmani, A. (1993). A consumer-side experimental examination of signaling theory: Do consumers perceive warranties as signals of quality?. *Journal of Consumer Research*, *20*, 111-123. doi: https://doi.org/10.1086/209337.

Bray, J.G., & Neilson, J. (2017). Reviewing the impacts of coffee certification programmes on smallholder livelihoods. *International Journal of Biodiversity Science, Ecosystem Services & Management*, *13*, 216-232. doi: https://doi.org/10.1080/21513732.2017.1316520.

Cerjak, M., Naglić, T., Mesić, Z., & Tomić, M. *Croatian consumers' knowledge and attitudes towards fair trade*. 143rd Joint EAAE/AAEA Seminar, Naples, Italy. -- Retrieved from https://ageconsearch.umn.edu/record/202756/files/282.pdf.

Chen, M.F. (2020). The impacts of perceived moral obligation and sustainability self-identity on sustainability development: A theory of planned behavior purchase intention model of sustainability-labeled coffee and the moderating effect of climate change skepticism. *Business Strategy and the Environment*, *29*, 2404-2417. doi: https://doi.org/10.1002/bse.2510.

Chen, M.F., & Tung, P.J. (2014). Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *International Journal of Hospitality Management*, *36*, 221-230. doi: https://doi.org/10.1016/j.ijhm.2013.09.006.

de Mejia, E.G., & Ramirez-Mares, M.V. (2014). Impact of caffeine and coffee on our health. *Trends in Endocrinology and Metabolism*, *25*, 489-492. doi: https://doi.org/10.1016/j.tem.2014.07.003.

Emekci, S. (2019). Green consumption behaviours of consumers within the scope of tpb. *Journal of Consumer Marketing*, *36*, 410-417. doi: https://doi.org/10.1108/JCM-05-2018-2694.

Fairtrade International (28 August 2023). *Key issues*. -- www.fairtrade.net/issue.

FAO (28 August 2023). *Coffee*. -- www.fao.org/markets-and-trade/commodities/coffee/en.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley Publishing Company.

Foreign Agricultural Service USDA (28 August 2023). *Coffee: World markets and trade*. -- www.fas.usda.gov/data/coffee-world-markets-and-trade.

Grabs, J., Kilian, B., Hernández, D.C., & Dietz, T. (2016). Understanding coffee certification dynamics: A spatial analysis of voluntary sustainability standard proliferation. *International Food Agribusiness Management Review*, *19*, 31-56.

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2018). *Multivariate data analysis* (8th ed.). Cengage Learning EMEA.

Halder, P., Pietarinen, J., Havu-Nuutinen, S., Pöllänen, S., & Pelkonen, P. (2016). The theory of planned behavior model and students' intentions to use bioenergy: A cross-cultural perspective. *Renew Energy*, *89*, 627-635. doi: https://doi.org/10.1016/j.renene.2015.12.023.

Hameed, I., Waris, I., & Amin ul Haq, M. (2019). Predicting eco-conscious consumer behavior using theory of planned behavior in pakistan. *Environmental Science and Pollution Research*, *26*, 15535-15547. doi: https://doi.org/10.1007/s11356-019-04967-9.

Han, H., Hsu, L.T.J., & Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management*, *31*, 325-334. doi: https://doi.org/10.1016/j.tourman.2009.03.013.

Han, H., & Kim, Y. (2010). An investigation of green hotel customers' decision formation: Developing an extended model of the theory of planned behavior. *International Journal of Hospitality Management*, *29*, 659-668. doi: https://doi.org/10.1016/j.ijhm.2010.01.001.

Han, H., Lee, S., & Lee, C.K. (2011). Extending the theory of planned behavior: Visa exemptions and the traveller decision-making process. *Tourism Geographies*, *13*, 45-74. doi: https://doi.org/10.1080/14616688.2010.529930.

Heidari, A., Kolahi, M., Behravesh, N., Ghorbanyon, M., Ehsanmansh, F., Hashemolhosini, N., & Zanganeh, F. (2018). Youth and sustainable waste management: A sem approach and extended theory of planned behavior. *Journal of Material Cycles and Waste Management*, *20*, 2041-2053. doi: https://doi.org/10.1007/s10163-018-0754-1.

Ho, T.Q., Hoang, V.-N., Wilson, C., & Nguyen, T.-T. (2018). Eco-efficiency analysis of sustainability-certified coffee production in vietnam. *Journal of Cleaner Production*, *183*, 251-260. doi: https://doi.org/10.1016/j.jclepro.2018.02.147.

Hoeksma, D.L., Gerritzen, M.A., Lokhorst, A.M., & Poortvliet, P.M. (2017). An extended theory of planned behavior to predict consumers' willingness to buy mobile slaughter unit meat. *Meat Science*, *128*, 15-23. doi: https://doi.org/10.1016/j.meatsci.2017.01.011.

Huang, C.C., Li, S.P., Lai, J.C.M., Chan, Y.K., & Hsieh, M.Y. (2023). Research on the international sustainable practice of the taiwanese food and agricultural education law under the current global food security challenges. *Foods*, *12*, 2785. doi: https://doi.org/10.3390/foods12142785.

Huang, Y.C., Yang, M., & Wang, Y.C. (2014). Effects of green brand on green purchase intention. *Marketing Intelligence & Planning*, *32*, 250-268. doi: https://doi.org/10.1108/MIP-10-2012-0105.

Iqbal, M., Nazir, A., Sadaf, T., Yousaf, A., & Shahwani, M. (2022). Determinants of consumers perceptions regarding fresh and tetra pack milk in faisalabad, pakistan. *Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences*, *38*, 150-155. doi: https://doi.org/10.47432/2022.38.2.8.

Jang, H.W., & Lee, S.B. (2019). Applying effective sensory marketing to sustainable coffee shop business management. *Sustainability*, *11*, 6430. doi: https://doi.org/10.3390/su11226430.

Khaliqi, M., Gurning, H., Pane, T., Novanda, R., & Darmansyah, D. (2021). The prediction of consumers' intention in choosing organic coffee: An application of theory planned behaviour. *IOP Conference Series: Earth and Environmental Science*, *782*, 022057. doi: https://doi.org/10.1088/1755-1315/782/2/022057.

Kidwell, B., & Jewell, R.D. (2003). An examination of perceived behavioral control: Internal and external influences on intention. *Psychology & Marketing*, *20*, 625-642. doi: https://doi.org/10.1002/mar.10089.

Labbe, D., Ferrage, A., Rytz, A., Pace, J., & Martin, N. (2015). Pleasantness, emotions and perceptions induced by coffee beverage experience depend on the consumption motivation (hedonic or utilitarian). *Food Quality and Preference*, *44*, 56-61. doi: https://doi.org/10.1016/j.foodqual.2015.03.017.

Lee, H.J., & Yun, Z.S. (2015). Consumers' perceptions of organic food attributes and cognitive and affective attitudes as determinants of their purchase intentions toward organic food. *Food Quality and Preference*, *39*, 259-267. doi: https://doi.org/10.1016/j.foodqual.2014.06.002.

Lee, K.H., Bonn, M.A., & Cho, M. (2015). Consumer motives for purchasing organic coffee: The moderating effects of ethical concern and price sensitivity. *International Journal of Contemporary Hospitality Management*, *27*, 1157-1180. doi: https://doi.org/10.1108/IJCHM-02-2014-0060.

Lentijo, G.M., & Hostetler, M. (Apr. 1, 2020). *Evaluating certified coffee programs*. -- https://edis.ifas.ufl.edu/uw351.

Liobikienė, G., Mandravickaitė, J., & Bernatonienė, J. (2016). Theory of planned behavior approach to understand the green purchasing behavior in the eu: A cross-cultural study. *Ecological Economics*, *125*, 38-46. doi: https://doi.org/10.1016/j.ecolecon.2016.02.008.

Liu, C.C., Chen, C.W., & Chen, H.S. (2019a). Measuring consumer preferences and willingness to pay for coffee certification labels in taiwan. *Sustainability*, *11*, 1297. doi: https://doi.org/10.3390/su11051297.

Liu, P., Guo, Q., Ren, F., Wang, L., & Xu, Z. (2019b). Willingness to pay for self-driving vehicles: Influences of demographic and psychological factors. *Transportation Research Part C: Emerging Technologies*, *100*, 306-317. doi: https://doi.org/10.1016/j.trc.2019.01.022.

Madden, T.J., Ellen, P.S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin*, *18*, 3-9. doi: https://doi.org/10.1177/0146167292181001.

Maichum, K., Parichatnon, S., & Peng, K.C. (2016). Application of the extended theory of planned behavior model to investigate purchase intention of green products among thai consumers. *Sustainability*, *8*, 1077. doi: https://doi.org/10.3390/su8101077.

Mohamed, Z., Kit Teng, P., Rezai, G., & Sharifuddin, J. (2014). Malaysian consumers' willingness-to-pay toward eco-labeled food products in klang valley. *Journal of Food Products Marketing*, *20*, 63-74. doi: https://doi.org/10.1080/10454446.2014.921876.

My, N.H.D., Demont, M., Van Loo, E.J., de Guia, A., Rutsaert, P., Tuan, T.H., & Verbeke, W. (2018). What is the value of sustainably-produced rice? Consumer evidence from experimental auctions in vietnam. *Food Policy*, *79*, 283-296. doi: https://doi.org/10.1016/j.foodpol.2018.08.004.

Nguyen, T.T.H., Hung, R.J., Lee, C.H., & Nguyen, T.T.H. (2019). Determinants of residents' e-waste recycling behavioral intention: A case study from vietnam. *Sustainability*, *11*, 164. doi: https://doi.org/10.3390/su11010164.

Nicolau, J.L., Guix, M., Hernandez-Maskivker, G., & Molenkamp, N. (2020). Millennials' willingness to pay for green restaurants. *International Journal of Hospitality Management*, *90*, 102601. doi: https://doi.org/10.1016/j.ijhm.2020.102601

O'Connor, E.L., Sims, L., & White, K.M. (2017). Ethical food choices: Examining people's fair trade purchasing decisions. *Food Quality and Preference*, *60*, 105-112. doi: https://doi.org/10.1016/j.foodqual.2017.04.001.

Oroian, C., Safirescu, C., Harun, R., Chiciudean, G., Arion, F., Muresan, I., & Bordeanu, B. (2017). Consumers' attitudes towards organic products and sustainable development: A case study of romania. *Sustainability*, *9*, 1559. doi: https://doi.org/10.3390/su9091559.

Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, *29*, 123-134. doi: https://doi.org/10.1016/j.jretconser.2015.11.006.

Pedini, S., Cecchini, L., & Santucci, F.M. (2017). Fair trade coffee potential market in italy: A roaster sector analysis. *Italian Review of Agricultural Economics*, *72*, 195-214.

Petrescu, D., & Petrescu-Mag, R. (2015). Organic food perception: Fad, or healthy and environmentally friendly? A case on romanian consumers. *Sustainability*, *7*, 12017-12031. doi: https://doi.org/10.3390/su70912017.

Puspitasari, R., & Balqiah, T. (2020). Influence of healthy lifestyle, health concerns, environmental concern, and product quality toward intention to purchase organic coffee. In *Contemporary research on business and management* (pp. 144-148). CRC Press. doi: https://doi.org/10.1201/9781003035985-34.

Rainforest Alliance (18 September 2023). *Rainforest alliance certified coffee*. -- www.rainforest-alliance.org/insights/rainforest-alliance-certified-coffee.

Rainforest Alliance (18 September 2023). *Utz certification (now part of the rainforest alliance)*. -- www.rainforest-alliance.org/utz.

Ramírez-Correa, P., Rondán-Cataluña, F.J., Moulaz, M.T., & Arenas-Gaitán, J. (2020). Purchase intention of specialty coffee. *Sustainability*, *12*, 1329. doi: https://doi.org/10.3390/su12041329.

Roitner-Schobesberger, B., Darnhofer, I., Somsook, S., & Vogl, C.R. (2008). Consumer perceptions of organic foods in bangkok, thailand. *Food Policy*, *33*, 112-121. doi: https://doi.org/10.1016/j.foodpol.2007.09.004.

Ruangkanjanases, A., You, J.J., Chien, S.W., Ma, Y., Chen, S.C., & Chao, L.C. (2020). Elucidating the effect of antecedents on consumers' green purchase intention: An extension of the theory of planned behavior. *Frontiers in Psychology*, *11*, 1433. doi: https://doi.org/10.3389/fpsyg.2020.01433.

Ryan, J., & Casidy, R. (2018). The role of brand reputation in organic food consumption: A behavioral reasoning perspective. *Journal of Retailing and Consumer Services*, *41*, 239-247. doi: https://doi.org/10.1016/j.jretconser.2018.01.002.

Salem, S.F., & Salem, S.O. (2018). Self-identity and social identity as drivers of consumers' purchase intention towards luxury fashion goods and willingness to pay premium price. *Asian Academy of Management Journal*, *23*, 161-184. doi: https://doi.org/10.21315/aamj2018.23.2.8.

Senger, I., Borges, J.A.R., & Machado, J.A.D. (2017). Using structural equation modeling to identify the psychological factors influencing dairy farmers' intention to diversify agricultural production. *Livestock Science*, *203*, 97-105. doi: https://doi.org/10.1016/j.livsci.2017.07.009.

Sepúlveda, W.S., Chekmam, L., Maza, M.T., & Mancilla, N.O. (2016). Consumers' preference for the origin and quality attributes associated with production of specialty coffees: Results from a cross-cultural study. *Food Research International*, *89*, 997-1003. doi: https://doi.org/10.1016/j.foodres.2016.03.039.

Setyawan, A., Noermijati, N., Sunaryo, S., & Aisjah, S. (2018). Green product buying intentions among young consumers: Extending the application of theory of planned behavior. *Problems and Perspectives in Management*, *16*, 145-154. doi: https://doi.org/10.21511/ppm.16(2).2018.13.

Shi, H., Fan, J., & Zhao, D. (2017). Predicting household pm2.5-reduction behavior in chinese urban areas: An integrative model of theory of planned behavior and norm activation theory. *Journal of Cleaner Production*, *145*, 64-73. doi: https://doi.org/10.1016/j.jclepro.2016.12.169.

Shukla, S. (2019). A study on millennial purchase intention of green products in india: Applying extended theory of planned behavior model. *Journal of Asia-Pacific Business*, *20*, 322-350. doi: https://doi.org/10.1080/10599231.2019.1684171.

Singh, G., & Pandey, N. (2018). The determinants of green packaging that influence buyers' willingness to pay a price premium. *Australasian Marketing Journal*, *26*, 221-230. doi: https://doi.org/10.1016/j.ausmj.2018.06.001.

Sousa, A.G., Machado, L.M.M., Silva, E.F.d., & Costa, T.H.M.d. (2016). Personal characteristics of coffee consumers and non-consumers, reasons and preferences for foods eaten with coffee among adults from the federal district, brazil. *Food Science and Technology*, *36*, 432-438. doi: https://doi.org/10.1590/1678-457X.10015.

Terry, D.J., Hogg, M.A., & White, K.M. (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology*, *38*, 225-244. doi: https://doi.org/10.1348/014466699164149.

Ting, C.T., Hsieh, C.M., Chang, H.P., & Chen, H.S. (2019). Environmental consciousness and green customer behavior: The moderating roles of incentive mechanisms. *Sustainability*, *11*, 819. doi: https://doi.org/10.3390/su11030819.

United States Department of Agriculture (28 August 2023). *Opportunities for us coffee percolate in taiwan brewing market*. -- https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Opportunities%20for%20US%20Coffee%20Percolate%20in%20Taiwan%20Brewing%20Market_Taipei%20ATO_Taiwan_04-27-2021.

Ut-tha, V., Lee, P.P., & Chung, R. (2021a). Willingness to pay for sustainable coffee: A case of thai consumers. *SAGE Open*, *11*, 21582440211052956. doi: https://doi.org/10.1177/21582440211052956.

Ut-tha, V., Lee, P.P., & Chung, R.H. (2021b). Purchase intention of certified coffee: Evidence from thailand. *The Journal of Asian Finance, Economics and Business*, *8*, 583-592.

Utama, A.P., Sumarwan, U., Suroso, A.I., & Najib, M. (2021). Influences of product attributes and lifestyles on consumer behavior: A case study of coffee consumption in indonesia. *The Journal of Asian Finance, Economics and Business*, *8*, 939-950.

Van der Merwe, K., & Maree, T. (2016). The behavioural intentions of specialty coffee consumers in south africa. *International Journal of Consumer Studies*, *40*, 501-508. doi: https://doi.org/10.1111/ijcs.12275.

Vraneševic, T., & Stančec, R. (2003). The effect of the brand on perceived quality of food products. *British Food Journal*, *105*, 811-825. doi: https://doi.org/10.1108/00070700310511609.

Wann, J.W., Kao, C.Y., & Yang, Y.C. (2018). Consumer preferences of locally grown specialty crop: The case of taiwan coffee. *Sustainability*, *10*, 2396. doi: https://doi.org/10.3390/su10072396.

Wee, C.S., Ariff, M.S.B.M., Zakuan, N., Tajudin, M.N.M., Ismail, K., & Ishak, N. (2014). Consumers perception, purchase intention and actual purchase behavior of organic food products. *Review of Integrative Business Economics Research*, *3*, 378-397.

Yadav, R., & Pathak, G.S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production*, *135*, 732-739. doi: https://doi.org/10.1016/j.jclepro.2016.06.120.

Yang, S.H., Phan, H.T.T., Hsieh, C.M., & Li, T.N. (2022). What intentions and interesting information can attract consumers to scan qr code while buying eggs?. *Foods*, *11*, 1259. doi: https://doi.org/10.3390/foods11091259.

Zagata, L. (2012). Consumers' beliefs and behavioural intentions towards organic food. Evidence from the czech republic. *Appetite*, *59*, 81-89. doi: https://doi.org/10.1016/j.appet.2012.03.023.

Zhang, B., Fu, Z., Huang, J., Wang, J., Xu, S., & Zhang, L. (2018). Consumers' perceptions, purchase intention, and willingness to pay a premium price for safe vegetables: A case study of beijing, china. *Journal of Cleaner Production*, *197*, 1498-1507. doi: https://doi.org/10.1016/j.jclepro.2018.06.273.

**Veenarat Ut-tha**
Faculty of Environment and Resource Studies, Mahidol University, Thailand
999 Phuttamonthon 4 Road, Salaya, Nakhonpathom 73170, Thailand
Tel: +66-2441-5000 ext. 2105. Fax: +66-2441-9507. E-mail: veenarat.utt@mahidol.ac.th
Lecturer, she holds a Ph.D. degree in Agricultural Economics from Department of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Taiwan. Her research interests are related to agricultural economics, environmental economics, agribusiness management, and consumer behavior, particularly addressing social psychological factors that affect product purchasing behavior, and willingness to pay (WTP) for products produced by environmentally friendly processes.

**Rebecca Chung**
Department of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Taiwan
1 Shue-Fu Rd., Nei-Pu Hsiang, Pingtung 91201, Taiwan
Tel: +886-770-3202-6432. Fax: +886-8-7740446. E-mail: rebecca@mail.npust.edu.tw
Associate Professor/Department Chair. She received a Ph.D. degree from the Department of Food and Resource Economics, University of Florida, Florida, USA. Her research interests are in the fields of consumer demand analysis, DEA/SFA analysis, marketing and trade.