

RESEARCH ARTICLE

# Determinants of Thailand’s Canned Seafood Industry Product Identity: A Structural Equation Model Analysis

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**Abstract:** Thailand has often been referred to as “kitchen of the world” whose food industry represents over 20% of its gross domestic production (GDP). As part of this, Thailand’s seafood processing industry is now ranked fourth globally, contributing over US\$6.5 billion to the economy. The researchers, therefore, set out to investigate the impact of consumers’ attitudes, product quality, value, branding, and product identity on five nationally recognized canned seafood product brands. Using systematic random sampling, 400 questionnaires were collected from consumers shopping at five Bangkok metropolitan area supermarkets. A confirmatory factor analysis was first used, followed by structural equation modeling to analyze the interrelationships of the five constructs. Results showed that all variables influenced identity, which included *attitude, value, brand, and quality (0.90, 0.53, 0.50, and 0.25, respectively)*.

**Keywords:** attitudes, brand, food, nutrition, quality, value

Thailand has been referred to as the “kitchen of the world,” with the Thai seafood processing industry ranked fourth globally, contributing over US\$6.5 billion to Thailand’s agricultural sector (Food and Agriculture Organization, 2016). Additionally, in 2017, Thailand exported canned tuna which was valued at US\$1.49, making Thailand the world’s largest exporter (Food and Agriculture Organization, 2018).

Also, according to a 2016 report from the International Labour Organization (ILO), the Thai seafood industry has gone global with the use of foreign labour and inputs, and is now exporting processed and semi-processed seafood products to the United States, the European Union (EU), and Japan (Errighi, Mamic,

& Krogh-Poulsen, 2016). Growing international market shares and economic development have been achieved through the attraction of foreign capital, the achievement of good sanitary standards, and investment in appropriate infrastructure in the sector (Ministry of Foreign Affairs, 2016). Therefore, the Thai seafood sector is an example of economic upgrading through participation in global supply chains (GSCs).

These GSCs are also important for food security and employment opportunities (Garcia & Rosenberg, 2010). In 2014, the Food and Agriculture Organization (2016), reported that the food fish supply grew by an estimated 3.2%, outpacing world population growth. Worldwide exports amounted to US\$148 billion as

well. Employment in this sector has also experienced similar expansion, with the seafood industry estimated to be providing 10–12% of the world's population livelihoods (Food and Agriculture Organization, 2016). The sector is also a major contributor to global value creation and economic development, and provides significant livelihoods basis for millions of people.

Concerning the world's seven most important commercial tuna species, the volume of landed tuna rose to 4.99 million metric tons in 2014, with an estimated dock value of US\$9.8 billion. The estimated end value was US\$32.9 billion, or US\$42.2 billion when including the full canned product price (Nickson, 2016). Also, according to the same analysis, the end value of Pacific tuna when including the full canned tuna product price, surpassed \$22.7 billion in 2014.

Nickson (2016) has also reported that Tuna are globally some of the most economically valuable fish, and function as important predator species in marine ecosystems. Worldwide in 2012, tuna canneries processed 3.5 million metric tons, which translates into about 1.4 million metric tons of canned and other shelf-stable products. Also, according to a Greenpeace USA (2016) study, globally, commercial tuna is worth about US\$42 billion per year at the final point of sale.

With canned tuna, volume is key. The price per metric ton may be modest, but the total tonnage is enormous. In 2012, more than 75% of all landed tuna went to canneries for processing. Two years later, 79% of landed tuna was destined for canneries, as canned tuna continues to be a staple protein around the world.

### **Thailand's Tuna Industry**

Thailand ranks number one in the world in canned tuna production, and its production of about 692,870 tons accounts for more than half of the global trade (Boccuzzi, 2015). Thailand's canned tuna industry is also export-oriented, with about 95% of total production destined for foreign markets, which are mainly Europe, Japan, and the United States.

Part of this strength comes from free trade agreements signed between Thailand and Peru (January 2012), and Thailand and Chile (November 2015), which allow the transfer and sale of products between

the two countries at zero tariffs. In Peru, Thai and other Asian tuna canneries supply 90% of the market, while in Chile, they supply over 50% of the market (Mereghetti, 2017).

The canned tuna supply chain can be divided into three broad categories—fishery, processing, and retail and distribution. Even though Thailand is the world's largest tuna exporter, profits are eroded by the need to import raw tuna, which can account for 70% of the total production costs (United Nations Environmental Programme, 2009). Although the world's largest tuna canner is headquartered in Thailand (Janssen, 2017), Thai fishing vessels contribute only a very small part of the tuna supply. In 2013, domestic tuna fishing accounted for only 20,000 tons, while imported tuna was 1 million tons, with raw fish stocks being mainly imported from other fishing fleets from China, Indonesia, Japan, and Taiwan. Furthermore, skipjack is the most common catch (accounting for 50% of global catches), followed by yellowfin (30%), bigeye (10%), albacore (7%), and bluefin (3%; Errighi et al., 2016). Yellowfin stocks are the only ones not being over-exploited.

Despite the competitive disadvantage of having to import raw tuna (Apisitniran, 2016), Thailand has developed a competitive advantage in related and supporting industries such as canning and sea transport. It has also benefitted from strong business ties and investment flows from developed markets, mainly Europe and the United States. The industry is also heavily dependent on low labor costs, and therefore, mainly employs immigrant workers, who represent 60–70% of the total of 80,000 workers in the processing sector (Boccuzzi, 2015; Janssen, 2017).

The Thai canned tuna industry, however, is highly consolidated, with all 18 groups belonging to the Thai Tuna Industry Association (TTIA). However, the global raw tuna supply is controlled by only three integrated traders, including Taiwan's FCF, Japan's Itochu, and Tri-Marine from the United States (Errighi et al., 2016). This highly integrated system allows for strong controls throughout the supply chain. Indeed, the Thai canned tuna industry is subject to strong monitoring mechanisms and decent labor regulations, as pressure from overseas buyers has compelled Thai canned tuna processors to achieve and maintain high

product quality and proper labor standards in their operation.

Research is limited when it comes to the field of canned seafood, especially on research where product packaging cues influence the consumer's decision-making process (Midttun, 2015). Furthermore, value-added seafood products are becoming increasingly important in satisfying the demands for safe, high-quality seafood throughout the world. As such, there are growing opportunities in the marketplace for expansion possibilities, marketing studies, and consumer-related investigations (Morrissey & DeWitt, 2013).

## Literature Review

### *Attitude*

Brand associations are an important element in a brand's success. Additionally, brand image and brand knowledge are also crucial (Farquhar & Herr, 1993), since they convey the attitude developed toward a given brand by consumers (Aaker, 1996). Aaker (1996) also believed that brand association and brand equity are strongly interrelated, while Yoo, Donthu, and Lee (2000) confirmed that a strong brand association leads to higher brand loyalty. Han, Nguyen, and Lee (2015) also saw the positive effect of brand association on brand reputation.

Wang (2013) also discussed consumer attitudes toward visual packaging and concluded that it directly influences consumer-perceived food product quality and brand preference. It was also determined that perceived food product quality directly and indirectly (through product value) affects brand preference.

O'Callaghan and Kerry (2016) examined consumers' attitudes concerning the use of technology and packaging. Results indicated that consumers were unwilling at first to pay for higher technology in packaging, but as awareness increased concerning the benefits, attitudes changed. This is consistent with Harre and Secord (1973), who discussed attitudes as certain regularities in an individual's feelings, thoughts, and predispositions to act toward some aspect of their environment. Arnold, Cooper, and Robertson (1995) defined attitudes as a positive or negative tendency towards the object of the attitude.

Furthermore, Agrawal (2017) has reported that consumers want to know as much as possible, and brands which give more product information, inspire more trust. Both Millennials and Gen Z-ers, crave authenticity, and they want to know the "who, where, why, how, and what" behind every facet of a brand. Customers are detail-oriented, and they care about aesthetics.

From the above theories and scholars' concepts of attitude, the following four items were therefore placed into the research framework: labeling (X1), brand confidence (X2), packaging (X3), and size and material (X4). From this, the following three hypotheses were developed:

- H1: Attitude has a direct positive influence on quality.
- H2: Attitude has a direct positive influence on value.
- H3: Attitude has a direct positive influence on identity.

### *Quality*

Aaker and Joachimsthaler (2000) stated that perceived quality is derived from a special type of association, partly because it influences brand associations in many contexts and it has been empirically shown to affect profitability. Wang (2013) showed that perceived food product quality directly and indirectly (through product value) affects brand preference. This was consistent with Rigaux-Bricmont (1982) whose research concerning coffee brands within the Belgian coffee market stated that extrinsic cues influence the consumers' quality evaluation.

This is consistent with Ryu, Lee, and Kim (2012), which determined that the quality of the physical environment and food, were significant predictors of customer perceived value within the restaurant industry.

From the above theories and scholars' concepts of product quality, the following three items were therefore placed into the research framework: food quality (Y4), food taste (Y5), and packaging quality (Y6). From this, the following two hypotheses were developed:

H4: Quality has a direct positive influence on brand.

H5: Quality has a direct positive influence on identity.

### *Value*

Ryu et al. (2012) suggested that perceived value is indeed a significant determinant of customer satisfaction, and customer satisfaction is a significant predictor of behavioral intentions within the food service sector. Specifically, within the seafood sector, value-added seafood products are becoming increasingly important in satisfying the demands for safe, high-quality seafood throughout the world (Morrissey & DeWitt, 2013).

There are numerous advantages to value-added processing, including creating safer products, maintaining high-quality characteristics, extending shelf life, and enhancing the economic return to the producer/processor (Morrissey & DeWitt, 2013; Yaklai, Suwunnamek, & Srinuan, 2017). There is also often a synergy between improved safety and new product development that occurs, which can improve the chance of success as long as the quality is not sacrificed.

“Values” attributes, such as sustainability and eco-labeling, have also become important drivers for maintaining and developing new markets, which is in conjunction with a new emphasis for health-driven products that accommodate seafood products (Morrissey & DeWitt, 2013). Finally, the development of new technologies and the growth of aquaculture continue to provide new market opportunities for a wide array of products. Value-added processing will play an important role in meeting the demands of the consumer for safe, wholesome, high-quality seafood products (Morrissey & DeWitt, 2013).

From the above theories and scholars' concepts of product value, the following three items were therefore placed into the research framework: pricing (Y7), value (Y8), and brand (Y9). From this, the following two hypotheses were developed:

H6: Value has a direct positive influence on brand.

H7: Value has a direct positive influence on identity.

### *Brand*

Lee and Chang (2014) have suggested that brands can be one of the most important assets in value investing within the seafood marketing industry. This is consistent with the research from Vietnam concerning brand personality on brand loyalty in frozen seafood markets, in which branding was stated to have a considerable influence on customers' behavior, attitude, and preference in their buying process (Nguyen & Thanh, 2016). Furthermore, according to Viettrack's (Intage Vietnam LLC., 2009) market research of 600 Vietnamese consumers, more than 80% of the consumers surveyed in three out of four biggest cities in Vietnam said they seldom switch brands.

In a U.S. research on full-service casual restaurants, Kim, Magnini, and Singal (2011) indicated that brand personality perceptions have a positive effect on brand preference and attitudinal loyalty, which in turn have a positive influence on word-of-mouth (W-O-M) communication.

Dick and Basu (1994) determined that customer loyalty is the strength of the relationship between an individual's relative attitude and repeat patronage, and further indicated that customer loyalty is not only a behavioral phenomenon but the customer's attitude as well. Garland and Gendall (2004) confirmed this and stated that both attitude and behavior are important determinants of customer loyalty. Park (2009) also determined that customer satisfaction and trust were crucial in establishing a customer's attitudinal brand loyalty. Oliver (1999) additionally defined customer loyalty as a deeply held commitment to re-patronize a preferred service consistently in the future.

From the above theories and scholars' concepts of brand importance, the following three items were therefore placed into the research framework: famous brand (Y10), brand loyalty (Y11), and brand quality (Y12). From this, the following hypothesis was developed:

H8: Brand has a direct positive influence on identity.

### *Identity*

Upshaw (2000) stated that the essence of brand identity is brand positioning and brand personality.

Kapferer (1997) claimed that we have entered a new age of brand identity, which is comprised of six aspects—physic, personality, culture, relationships, reflection, and self-image. These aspects, therefore, define the brand and delineate the boundaries within which it can change and develop. As Aaker (1996) has said, brand positioning is a component of brand identity and value proposition, which needs to be actively communicated to the consumer and demonstrated as an advantage over competing brands. In Keller’s (2005) brand equity model, the foundation was brand identity, which is figuring out and communicating what your brand is all about.

From the above theories and scholars’ concepts of identity importance, the following three items were therefore placed into the research framework: brand recognition (Y1), unique brand (Y2), and high-quality brand (Y3).

Based on the above hypotheses and review of the literature, we have developed the conceptual framework (Figure 1) which includes the causal relationships between attitude, quality, value, brand, and identity.

**Methods**

Multiple research methods were applied to collect, analyze, and validate the quantitative data from the survey questionnaires, with qualitative data from in-depth interviews applied to verify the interpretation of the data analysis. Maximum likelihood estimation (MLE) was used to estimate the parameters to categorize sets of data derived from the surveys and to identify missing values (Maddala, 1983; Pindyck & Rubinfeld, 1991). A measurement model was utilized to observe the latent variables, with the validity and reliability of data evaluated using confirmatory factor analysis (CFA). LISREL 9.1 software was used to analyze the data, verify the proposed hypotheses, and evaluate the significance of the theories and the positive correlation of the variables (Hair, Hult, Ringle, & Sarstedt, 2016; Jöreskog, Olsson, & Fan, 2016).

Systematic random sampling was used to select every fifth shopper at five neighborhood supermarkets (Pathumwan, Bangkapi, Bangkae, Bangna, and Ladprao) in the Bangkok metropolitan area who purchased and consumed canned and processed

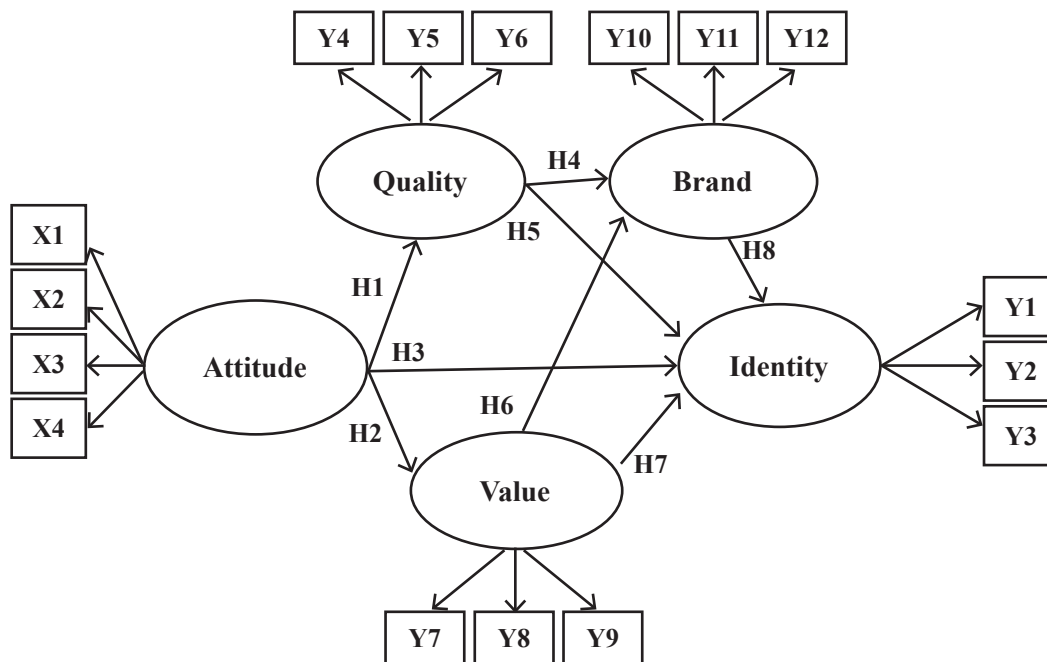


Figure 1. Conceptualized model.

seafood. The student survey team were positioned in front of the canned seafood product shelves in September 2016 between the hours of 11:00–13:00 and 17:00–19:00, with the goal of obtaining 40 completed questionnaires in each time block from each of the five locations, until the targeted goal of 400 questionnaires (audited) was accomplished.

The questionnaires contained two parts (Table 1). Part 1 contained seven items concerning the general information of the consumers taking the survey. Part 2 consisted of five constructs, 16 observed variables, and 57 items (64 items in total).

Consumer's responses were rated using a seven-level Likert type agreement scale in which "strongly disagree (= 1)" and "strongly agree (= 7)" are the anchor points. The items for the rating scales were adapted from reviewing the relevant variables of existing theories and empirical research findings (Table 1).

Questionnaire validation enhancement was accomplished in a two-step process:

(1) Content validity was evaluated by using item-objective congruence (IOC) values, with the IOC value of 0.6 or more being considered satisfactory. Most scholars' credit Rovinelli and Hambleton (1977) with the creation of the IOC, which has become a test development procedure for evaluating content validity at the item development stage. Using this criterion, the content validity was reviewed by five researchers to determine the relevancy and validity of the questions, including the latent variables. From this process, the IOC showed values having an average of 0.98 for the overall content, concurring with the objectives of the evaluation (Rovinelli & Hambleton, 1977).

(2) The reliability was estimated using Cronbach's  $\alpha$ , with values greater than 0.7 considered acceptable (George & Mallery, 2010; Tavakol & Dennick, 2011).

**Table 1**  
*Survey Constructs, Observed Variables, and Literature Review Summary*

| Latent Variables | Item | Observed variables (57 items total) | Literature Review Summary   |
|------------------|------|-------------------------------------|---|
| Attitude         | X1   | labeling (6)                        | Aaker (1996), Agrawal (2017), Arnold et al. (1995), Farquhar & Herr (1993), Harre & Secord (1973), O'Callaghan & Kerry (2016), Wang (2013), and Yoo et al. (2000)                         |
|                  | X2   | brand confidence (4)                |   |
|                  | X3   | packaging (4)                       |   |
|                  | X4   | size and material (5)               |   |
| Identity         | Y1   | brand recognition (3)               | Aaker (1996), Kapferer (1997), Keller (2005), and Upshaw (2000)   |
|                  | Y2   | unique brand (4)                    |   |
|                  | Y3   | high quality brand (4)              |   |
| Quality          | Y4   | food quality (3)                    | Aaker & Joachimsthaler (2000), Rigaux-Bricmont (1982), Ryu et al. (2012), and Wang (2013)   |
|                  | Y5   | food taste (2)                      |   |
|                  | Y6   | packaging quality (3)               |   |
| Value            | Y7   | pricing (2)                         | Morrissey & DeWitt (2013), Ryu et al. (2012), and Yoo et al. (2000)   |
|                  | Y8   | value (3)                           |   |
|                  | Y9   | brand (2)                           |   |
| Brand            | Y10  | famous brand (4)                    | Chaudhuri & Holbrook (2001), Dick & Basu (1994), Garland & Gendall (2004), Kim et al. (2011), Lee & Chang (2014), Nguyen & Thanh (2016), Oliver (1999), Park (2009), and Viettrack (2009) |
|                  | Y11  | brand loyalty (5)                   |   |
|                  | Y12  | brand quality (3)                   |   |

**Table 2**  
*Descriptive Analysis (m=400)*

| <b>Gender</b>               | <b>Frequency</b> | <b>%</b> |
|-----------------------------|------------------|----------|
| Male                        | 164              | 41.00    |
| female                      | 236              | 59.00    |
| Total                       | 400              | 100      |
| <b>Age</b>                  |                  |          |
| 21–30 years old.            | 205              | 51.25    |
| 31–40 years old.            | 103              | 25.75    |
| 41–50 years old.            | 70               | 17.50    |
| 51–60 years old.            | 15               | 3.75     |
| Over 60 years old.          | 7                | 1.75     |
| Total                       | 400              | 100      |
| <b>Marital status</b>       |                  |          |
| Single                      | 256              | 64.00    |
| Married                     | 127              | 31.75    |
| Other                       | 17               | 4.25     |
| Total                       | 400              | 100      |
| <b>Education level</b>      |                  |          |
| Lower than primary school.  | 6                | 1.50     |
| Primary school.             | 18               | 4.50     |
| Lower Secondary School      | 17               | 4.25     |
| High school.                | 43               | 10.75    |
| High Vocational Certificate | 79               | 19.75    |
| Undergraduate degree        | 226              | 56.50    |
| Graduate degree.            | 11               | 2.75     |
| Total                       | 400              | 100      |
| <b>Monthly income</b>       |                  |          |
| Less than 10,000 baht.      | 105              | 26.25    |
| 10,001–20,000 baht.         | 160              | 40.00    |
| 20,001-30,000 baht.         | 91               | 22.75    |
| 30,001-40,000 baht.         | 31               | 7.75     |
| 40,001-50,000 baht.         | 9                | 2.25     |
| Over 50,000 baht.           | 4                | 1.00     |
| Total                       | 400              | 100      |
| <b>Profession</b>           |                  |          |
| Civil service               | 29               | 7.25     |
| State enterprise            | 25               | 6.25     |
| Private company             | 77               | 19.25    |
| General laborer             | 126              | 31.50    |
| Entrepreneur                | 105              | 26.25    |
| Other                       | 38               | 9.50     |
| Total                       | 400              | 100      |
| <b>Preferred brand</b>      |                  |          |
| Three Lady Cooks            | 153              | 38.25    |
| Sealect                     | 76               | 19.00    |
| Roza                        | 57               | 14.25    |
| Super C-Chef                | 57               | 14.25    |
| Pumpui                      | 57               | 14.25    |
| Total                       | 400              | 100      |

**Results**

*Descriptive Analysis (n=400)*

The profiles from the 400 audited consumers revealed that most are single (64%), female (59%), and between the ages of 21–30 (51.25%; Table 2). Also, 89% had monthly incomes of less than 30,000 baht per month (US\$903.00). Interestingly, of the 400 individuals surveyed, 38.25% (153), indicated a buying preference for the “Three Lady Cooks” brand. Discussion concerning the reasons for such a high choice included brand recognition and use when the individuals were children, good value for a fair price, and assured reasonable quality.

*Reliability and Validity Measurement*

The reliability and validity of the indicators were verified by calculating Cronbach’s a for each latent variable and observed variable. George and Mallery (2010) illustrated the value of Cronbach’s a (Table 3), although some authors suggested higher values of 0.90–0.95 should be used (Tavakol & Dennick, 2011). The researchers use an initial 30 questionnaires to establish the initial instrument’s reliability. Thereafter, the reliability score was calculated by use of Cronbach’s a and was determined to be highly reliable as the score ranged between 0.899–0.925 for the five latent variables (Table 4).

**Table 3**

*Cronbach’s a Scale of Acceptability*

| <b>Cronbach’s Alpha</b> | <b>Internal consistency</b> |
|-------------------------|-----------------------------|
| $\alpha \geq 0.9$       | Excellent                   |
| $0.9 > \alpha \geq 0.8$ | Good                        |
| $0.8 > \alpha \geq 0.7$ | Acceptable                  |
| $0.7 > \alpha \geq 0.6$ | Questionable                |
| $0.6 > \alpha \geq 0.5$ | Poor                        |
| $0.5 > \alpha$          | Unacceptable                |

*Confirmatory Factor Analysis (CFA) Results*

After reviewing the research documents and relevant theory, CFA analysis was used to test the interrelationships of the dependent and independent variables. Convergence validity was adopted to measure the factor loadings of the observed variables and latent variables. All factor loadings showed values  $>0.5$ , indicating the consistency of the evaluating questions with respect to the suggested values ( $p$  value  $>0.5$ ; Fornell & Larcker, 1981). The reliability of each construct was also examined through CFA by using the composite reliability (CR) to measure the internal consistency of a single construct, marking all CR values exceeding 0.7 (ranging between 0.851 to 0.894),

**Table 4**

*Construct Reliability and Validity Results for Attitude from the CFA Analysis*

| <b>Construct</b> | $\alpha$ | <b>CR</b> | <b>AVE</b> | <b>Observed variables</b> | <b>loading</b> | <b>R<sup>2</sup></b> |
|------------------|----------|-----------|------------|---------------------------|----------------|----------------------|
| Attitude         | 0.924    | 0.883     | 0.635      | X1 (labeling)             | 0.771          | 0.594                |
|                  |          |           |            | X2 (brand confidence)     | 0.816          | 0.666                |
|                  |          |           |            | X3 (packaging)            | 0.764          | 0.584                |
|                  |          |           |            | X4 (size and material)    | 0.877          | 0.770                |



and stipulating the reliability of the measurement (Fornell & Larcker, 1981). Afterward, the validity of the measuring model fit was also tested by using the average variance extracted (AVE), resulting in values >0.5 (ranging between 0.635 and 0.741). From the use of LISREL 9.1, the results of the CFA indicated that  $\chi^2$  was not statistically significant ( $p > 0.05$ ),  $\chi^2 / df < 2.00$ , RMSEA < 0.05, GFI > 0.90, AGFI > 0.90 and SRMR < 0.05 (Table 4, Table 5, Figure 2, and Figure 3).

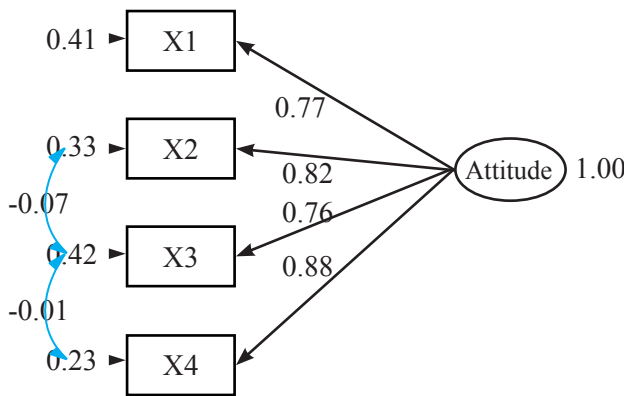


Figure 2. CFA of attitude.

Note. Chi-Square = 0.00, df = 0, p-value = 1.00000, RMSEA = 0.000

### Structural Equation Modeling (SEM) Results

LISREL 9.1 analysis results indicated multiple values for the goodness-of-fit indices, which confirmed the accuracy of the model fit (Table 6). The standardized root mean square residual (SRMR) was equal to 0.01. As SRMR is an absolute measure of fit, a value of zero indicates a perfect fit with a value of  $\leq 0.05$  indicating a good fit (Hu & Bentler, 1999). Further confirmation was established as the results of the goodness-of-fit index (GFI) equaled 0.99, and the adjusted goodness-of-fit index (AGFI) equaled 0.98 (Kenny & McCoach, 2003). The root-mean-square error of approximation (RMSEA) was equal to 0.000 (Chen, Curran, Bollen, Kirby, & Paxton, 2008).

All variables in the model had a positive influence on identity. They can describe the variance of factors influencing brand identity in packaging form of canned and processed seafood ( $R^2$ ) by 80%. There are four factors that affect the Thai seafood canned seafood industry identity. These are *attitude*, *value*, *brand*, and *quality*, 0.90, 0.53, 0.50, and 0.25, respectively.

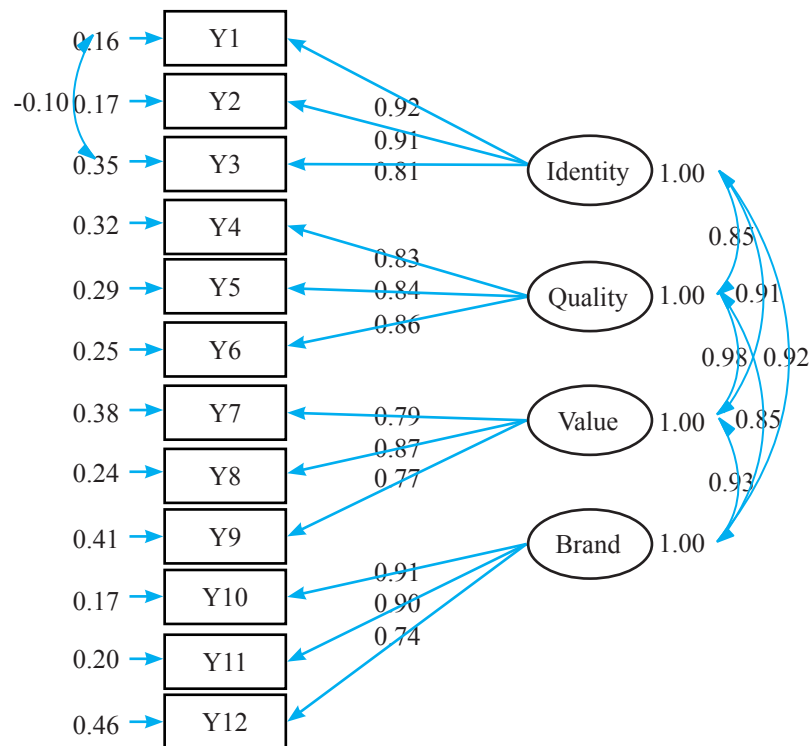


Figure 3. CFA of the independent latent variables.

Note. Chi-Square = 16.33, df = 33, p-value = 0.99327, RMSEA = 0.000

**Table 5***Construct Reliability and Validity Results for Identity, Quality, Value, and Brand from the CFA Analysis*

| Constructs | $\alpha$ | CR    | AVE   | Observed variables      | loading | R <sup>2</sup> |
|------------|----------|-------|-------|-------------------------|---------|----------------|
| Identity   | 0.899    | 0.918 | 0.775 | Y1 (brand recognition)  | 0.917   | 0.840          |
|            |          |       |       | Y2 (unique brand)       | 0.912   | 0.831          |
|            |          |       |       | Y3 (high quality brand) | 0.808   | 0.654          |
| Quality    | 0.920    | 0.880 | 0.711 | Y4 (food quality)       | 0.825   | 0.680          |
|            |          |       |       | Y5 (food taste)         | 0.840   | 0.706          |
|            |          |       |       | Y6 (packaging quality)  | 0.863   | 0.746          |
| Value      | 0.905    | 0.851 | 0.656 | Y7 (pricing)            | 0.787   | 0.620          |
|            |          |       |       | Y8 (value)              | 0.871   | 0.758          |
|            |          |       |       | Y9 (brand)              | 0.767   | 0.589          |
| Brand      | 0.925    | 0.886 | 0.723 | Y10 (famous brand)      | 0.910   | 0.828          |
|            |          |       |       | Y11 (brand loyalty)     | 0.896   | 0.802          |
|            |          |       |       | Y13 (brand quality)     | 0.735   | 0.540          |

Note.  $\alpha$  = Cronbach's alpha, CR = construct reliability, AVE = average variance extracted, R<sup>2</sup> = item reliability

**Table 6***Criteria, Goodness-of-Fit Appraisal Values, and SEM Related Theory*

| Criteria Index       | Criteria      | Values | Results | Theory   |
|----------------------|---------------|--------|---------|--|
| Chi-square: $\chi^2$ | $p \geq 0.05$ | 27.83  | passed  | Rasch (1980)   |
| $\chi^2/df$          | $\leq 2.00$   | 0.50   | passed  | Byrne, Shavelson, & Muthén (1989)                                  |
| GFI                  | $\geq 0.90$   | 0.99   | passed  | Hair et al. (2016)   |
| AGFI                 | $\geq 0.90$   | 0.98   | passed  | Kenny & McCoach (2003)   |
| SRMR                 | $\leq 0.05$   | 0.01   | passed  | Hu & Bentler (1999)  |
| RMSEA                | $\leq 0.05$   | 0.00   | passed  | Chen et al. (2008), Hu & Bentler (1999)                            |
| Cronbach's Alpha     | $\geq 0.70$   | 0.92   | passed  | Cronbach (1997), George & Mallery (2010), Tavakol & Dennick (2011) |

Furthermore, the SEM results of the hypotheses testing revealed five positive correlations, which included H1, H2, H4, H6, and H8 (0.89, 0.94, 0.27, 0.68, and 0.50 respectively; Table 7). Support for this comes from the correlation coefficient values suggested in the Pearson product-moment correlation coefficient (PPMCC-Pearson's  $r$ ) and Spearman's rho in which the strength of the relationship is interpreted as follows (Pumim, Srinuan, & Panjakajornsak, 2017; Table 8):

- Small/weak:  $r = 0.10$  to  $0.29$
- Medium/moderate:  $r = 0.30$  to  $0.49$
- Large/strong:  $r = 0.50$  to  $1$

However, non-significant relationships were found in H3 (attitude and identity), H5 (quality and identity), and H7 (value and identity; Table 7, Table 8, and Figure 4).

**Table 7**  
*Hypotheses Testing Results*

| Hypotheses   | Coef. | t-test  | Results  |
|--|-------|---------|----------|
| H1: <i>Attitude</i> has a direct positive influence on <i>quality</i> .  | 0.89  | 16.60** | accepted |
| H2: <i>Attitude</i> has a direct positive influence on <i>value</i> .    | 0.94  | 16.91** | accepted |
| H3: <i>Attitude</i> has a direct positive influence on <i>identity</i> . | 0.19  | 0.87    | rejected |
| H4: <i>Quality</i> has a direct positive influence on <i>brand</i> .     | 0.27  | 3.49**  | accepted |
| H5: <i>Quality</i> has a direct positive influence on <i>identity</i> .  | 0.11  | 1.11    | rejected |
| H6: <i>Value</i> has a direct positive influence on <i>brand</i> .       | 0.68  | 8.64**  | accepted |
| H7: <i>Value</i> has a direct positive influence on <i>identity</i> .    | 0.18  | 0.91    | rejected |
| H8: <i>Brand</i> has a direct positive influence on <i>identity</i> .    | 0.50  | 4.31**  | accepted |

Note. \*\*Sig. < 0.01

**Table 8**  
*The Correlation Coefficient, Reliability, and AVE of the Latent Variables*

| Construct                     | identity    | quality     | value       | brand       | attitude    |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|
| identity                      | <b>1.00</b> |             |             |             |             |
| quality                       | 0.848       | <b>1.00</b> |             |             |             |
| value                         | 0.904       | 0.831       | <b>1.00</b> |             |             |
| brand                         | 0.924       | 0.837       | 0.907       | <b>1.00</b> |             |
| attitude                      | 0.897       | 0.886       | 0.938       | 0.879       | <b>1.00</b> |
| $r_c$ (Construct Reliability) | 0.918       | 0.880       | 0.851       | 0.886       | 0.883       |
| $r_v$ (AVE)                   | 0.775       | 0.711       | 0.656       | 0.723       | 0.653       |
|                               | 0.880       | 0.843       | 0.810       | 0.851       | 0.808       |

Note. Sig.  $\leq 0.01$ , the correlation coefficient between latent variables (below the diagonal in **bold**), reliability of latent variables ( $r_c$ ) and the average variance extracted (AVE).

Additionally, the analysis of the direct effect (DE), indirect effect (IE), and total effects (TE) of the latent

variables (identity, brand, attitude, quality, and value) on canned seafood identity was conducted (Table 9).

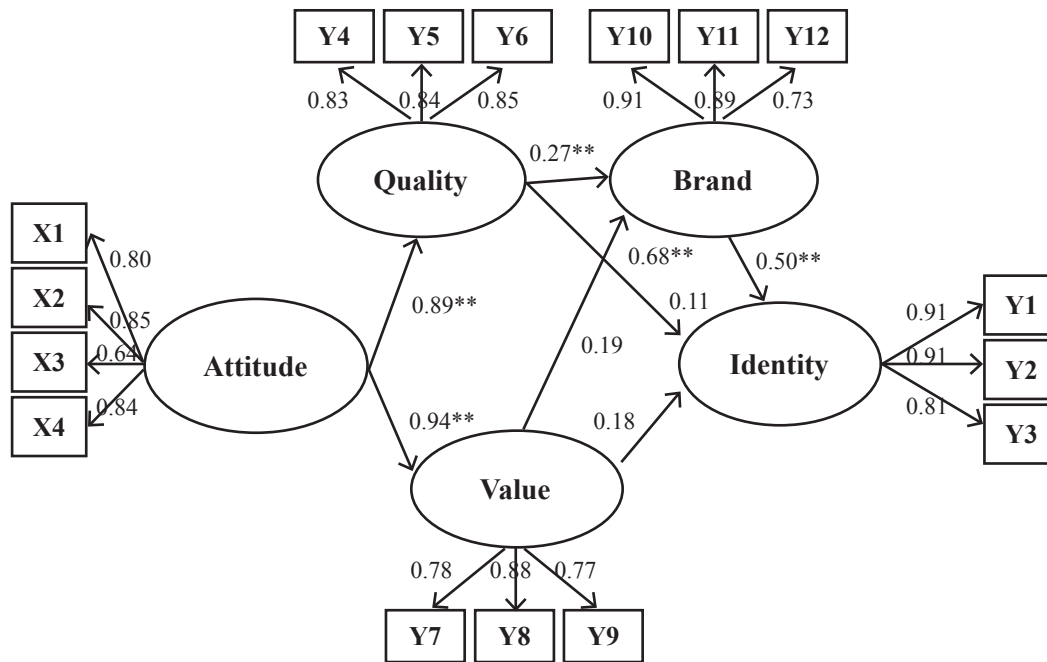


Figure 4. SEM final model with values from estimated (n=400).  
 Note. Chi-Square=27.83, df=56, p-value=0.99942, RMSEA=0.000

Table 9  
 SEM Standard Coefficients of Influence

| Dependent Variables |    | Independent Variables |         |        |        |          |
|---------------------|----|-----------------------|---------|--------|--------|----------|
|                     |    | R <sup>2</sup>        | quality | value  | brand  | attitude |
| identity            | DE |                       | 0.11    | 0.18   | 0.50** | 0.19     |
|                     | IE | .80                   | 0.14*   | 0.34** | –      | 0.71**   |
|                     | TE |                       | 0.25*   | 0.53*  | 0.50** | 0.90**   |
| quality             | DE |                       | –       | –      | –      | 0.89**   |
|                     | IE | .78                   | –       | –      | –      | –        |
|                     | TE |                       | –       | –      | –      | 0.89**   |
| value               | DE |                       | –       | –      | –      | 0.94**   |
|                     | IE | .88                   | –       | –      | –      | –        |
|                     | TE |                       | –       | –      | –      | 0.94**   |
| brand               | DE |                       | 0.27*   | 0.68** | –      | –        |
|                     | IE | .77                   | –       | –      | –      | 0.88**   |
|                     | TE |                       | 0.27*   | 0.68** | –      | 0.88**   |

Note. \*Sig. < 0.05, \*\*Sig. < 0.01

## Discussion

Results from the empirical study support H1, as consumers' attitudes had a direct and positive impact on canned seafood product quality, as the correlation coefficient between the variables was determined to be 0.89. This is consistent with findings from Ravaja, Somervuori, and Salminen (2013), in which higher prices are often viewed as a reliable cue of quality that triggers unconscious quality expectations and biased against consumers' food product experience.

Hypothesis H2 was also supported, which showed that consumer attitudes had a direct and positive impact on value (0.94). Concerning H3's proposed direct and positive relationship between attitudes and product identity, the hypothesis was rejected as the correlation coefficient between the variables was determined to be 0.19, which was significantly below the required criteria.

Concerning product quality, results were mixed as hypothesis H4 and the relationship to product brand was accepted (0.27), while H5's relationship between quality and identity was rejected (0.11). Therefore, quality evaluations are largely influenced by extrinsic quality cues reflected by the packaging design. If the package communicates high quality, consumers assume that the product is of high quality (Midttun, 2015). This is supported by Underwood (2003), in which it was determined that packaging as a product-related factor is important to the creation and communication of brand identity. Conte, Passantino, Longo, and Voslářová (2014) however, confirmed the complexity of consumers' ideas about food quality and indicated that it is complex, indeterminate, and uncertain. It is also sometimes not congruent.

Hypothesis H6 relationship between value and brand was also accepted (0.68). Support for this comes from a study in Korea concerning seafood brand equity in which it was concluded that brand equity for seafood products scarcely exists (Lee & Chang, 2014). When the study considered the relationship between value and identity, H7 was also rejected (0.18) as the direct effect and significance values were below the study's thresholds.

When brand was considered (H8), it was determined to have a direct and positive influence on identity (0.50).

Finally, according to Danish research, entering the canned seafood industry is highly competitive due to the challenges of product familiarity and brand differentiation. Therefore, new entrants must have superior taste, convenience and an acceptable price (Midttun, 2015). Brand loyalty is a thing of the past and now the companies that can best tell their stories, engage with audiences, and share the unique value their products offer will be most able to win the market share race (Agrawal, 2017).

### Ethical clearance:

The study was approved by the institution.

### Conflict of interest:

None.

## References

- Aaker, D. A. (1996). *Managing brand equity: Capitalizing on the value of the brand name*. New York, NY: The Free Press.
- Aaker, D. A., & Joachimsthaler, E. (2000). *Brand leadership*. New York, NY: The Free Press.
- Agrawal, A. J. (2017, April 6). Why product quality is an underrated marketing hack. *Forbes*. Retrieved from <http://tinyurl.com/y72zsstn>
- Apisitniran, L. (2016, August 26). Tuna shippers voice woes over rising baht. *Bangkok Post*. Retrieved from <http://tinyurl.com/yaabe8b7>
- Arnold, J., Cooper, C., & Robertson, I. (1995). *Work psychology: Understanding human behaviour in the workplace*. London, UK: Pitman Publishing.
- Boccuzzi, E. (2015, September). *Migrant and child labor in Thailand's shrimp and other seafood supply chains*. Asia Foundation and ILO. Retrieved from <http://tinyurl.com/yclj8263>
- Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, *105*, 456–466. Retrieved from <http://tinyurl.com/jjxcxb6>
- Chaudhuri, A., & Holbrook, M. (2001). The chain of effects from brand trust and brand effect to brand performance: The role of brand loyalty. *Journal of Marketing*, *65*(2), 81–93. <https://doi.org/10.1509/jmkg.65.2.81.18255>
- Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff

- points in RMSEA test statistic in structural equation models. *Social Methods Research*, 36(4), 462–494. <http://dx.doi.org/10.1177/0049124108314720>
- Conte, F., Passantino, A., Longo, S., & Voslářová, E. (2014). Consumers' attitude towards fish meat. *Italian Journal of Food Safety*, 3(3). <https://doi.org/10.4081/ijfs.2014.1983>
- Cronbach, L. J. (1997). *Essentials of psychological testing*. Boston, MA: Allyn & Bacon.
- Dick, A., & Basu, K. (1994). Customer loyalty: Towards an integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99–113. <https://doi.org/10.1177/0092070394222001>
- Erighi, L., Mamic, I., & Krogh-Poulsen, B. (2016, April). *Global supply chains: Insights into the Thai seafood sector*. Bangkok, Thailand: ILO DWT for East and South-East Asia and the Pacific. Retrieved from <http://tinyurl.com/yb2wqphm>
- Farquhar, P. H. & Herr, P. M. (1993). The dual structure of brand association. In D. A. Aaker & A. L. Biel (Eds.), *Brand equity & advertising: Advertising's role in building strong brands*, (pp. 263–277). Hillsdale, NJ: Lawrence Erlbaum Associates Publishers.
- Food and Agriculture Organization. (2016). *The state of world fisheries and aquaculture 2016: Contributing to food security and nutrition for all*. Rome, Italy: United Nations. Retrieved from <http://tinyurl.com/y9f5w7r8>
- Food and Agriculture Organization. (2018). *Global canned tuna trade unstable with stagnant US demand and declining Middle Eastern imports, while EU28 imports up moderately*. Retrieved from <https://tinyurl.com/yc3p5fdq>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- Garcia, S. M., & Rosenberg, A. A. (2010). Food security and marine capture fisheries: Characteristics, trends, drivers and future perspectives. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 365(1554), 2869–2880. <https://doi.org/10.1098/rstb.2010.0171>
- Garland, R., & Gendall, P. (2004). Testing Dick and Basu's customer loyalty model. *Australasian Marketing Journal*, 12(3), 81–87. [https://doi.org/10.1016/s1441-3582\(04\)70108-1](https://doi.org/10.1016/s1441-3582(04)70108-1)
- Greenpeace USA. (2016). *From sea to can: 2016 Southeast Asia canned tuna ranking*. Retrieved from <http://tinyurl.com/yblq4u38>
- George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference 17.0 Update* (10th ed.). Boston, MA: Pearson.
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage.
- Han, S. H., Nguyen, B., & Lee, T. J. (2015). Consumer-based chain restaurant brand equity, brand reputation, and brand trust. *International Journal of Hospitality Management*, 50, 84–93. <https://doi.org/10.1016/j.ijhm.2015.06.010>
- Harre, R., & Secord, P. (1973). *The explanation of social behaviour*. Totowa, NJ: Littlefield, Adams.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <http://dx.doi.org/10.1080/10705519909540118>
- Intage Vietnam LLC. (2009). *Vietnam regional differences - HCMC, Hanoi, Central (Danang), Mekong Delta (Can Tho) in brand attitudes, service requirement, price sensitivity, channel preference and A&P preferences*. Viettrack. Retrieved from <http://tinyurl.com/y726tphh>
- Janssen, P. (2017, November 1). Labor pains squeeze fast aging Thailand. *Asia Times*. Retrieved from <http://tinyurl.com/yb9snrra>
- Jöreskog, K. G., Olsson, U. H., & Fan, Y. W. (2016). *Multivariate analysis with LISREL*. Berlin, Germany: Springer.
- Kapferer, J. N. (1997). *Strategic brand management: Creating and sustaining brand equity long term*. London, UK: Kogan Page.
- Kenny, D. A., & McCoach, D. B. (2003). Effect of the number of variables on measures of fit in structural equation modeling. *Structural Equation Modeling*, 10(3), 333–351. [http://dx.doi.org/10.1207/S15328007SEM1003\\_1](http://dx.doi.org/10.1207/S15328007SEM1003_1)
- Keller, K. L. (2005). Strategic brand management process. In F. R. Esch FR. (Ed.), *Moderne Markenführung [Modern brand management]* (pp. 83–101). Wiesbaden, Germany: Gabler Verlag.
- Kim, D., Magnini, V. P., & Singal, M. (2011). The effects of customers' perceptions of brand personality in casual theme restaurants. *International Journal of Hospitality Management*, 30(2), 448–458. <https://doi.org/10.1016/j.ijhm.2010.09.008>
- Lee, Y., & Chang, J. B. (2014). *The effect of brand equity across seafood products*. Paper presented at the Southern Agricultural Economics Association's 2014 SAEA Annual Meeting, Dallas, Texas, February 1–4. Retrieved from <http://tinyurl.com/yan9qnm>
- Maddala, G. S. (1983). *Limited-dependent and qualitative variables in econometrics*. Cambridge, UK: Cambridge University Press.
- Mereghetti, M. (2017, January 24). Tuna exports from Thailand drop, as Bangkok skipjack prices reach \$1,700/t. *Undercurrent News*. Retrieved from <http://tinyurl.com/y84xwt8m>
- Middtun, V. (2015). *Challenges and opportunities launching new canned seafood products to Danish consumers* (Unpublished master's thesis). Copenhagen Business

- School, Denmark. Retrieved from <http://tinyurl.com/ychwqxqm>
- Ministry of Foreign Affairs. (2016). *Sufficiency economy philosophy: Thailand's path towards sustainable development goals*. Retrieved from <http://tinyurl.com/y7jrs3f4>
- Morrissey, M., & DeWitt, C. (2013). Value-added seafood. In I. S. Bozaris (Ed.), *Seafood processing: Technology, quality and safety* (pp. 343–358). West Sussex, UK: John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781118346174.ch13>
- Nickson, A. (2016). *Netting billions: A global valuation of tuna*. The Pew Charitable Trusts. Retrieved from <http://tinyurl.com/yba9vg9h>
- Nguyen, T. T. T., & Thanh, Q. (2016). An analysis of brand personality on brand loyalty in frozen seafood supermarkets in Ho Chi Minh City. *Journal of Aquaculture Research & Development*, 7, 1–8. <https://doi.org/10.4172/2155-9546.1000412>
- O'Callaghan, K. A. M., & Kerry, J. P. (2016). Consumer attitudes towards the application of smart packaging technologies to cheese products. *Food Packaging and Shelf Life*, 9, 1–9. <https://doi.org/10.1016/j.fpsl.2016.05.001>
- Oliver, R. L. (1999). Whence consume loyalty? *Journal of Marketing*, 63, 33–44. <https://doi.org/10.2307/1252099>
- Park, S.-H. (2009). *The antecedents and consequences of brand image: Based on Keller's customer-based brand equity* (Unpublished doctoral dissertation). Ohio State University, Columbus, OH. Retrieved from <http://tinyurl.com/lfh5asv>
- Pindyck, R. S., & Rubinfeld, P. L. (1991). *Econometric models and economics forecasts*. New York, NY: McGraw-Hill.
- Pumim, A., Srinuan, C., & Panjakajornsak, V. (2017). Mobile phone customer loyalty in Thailand: A path analysis case study. *Asia-Pacific Social Science Review*, 16(3), 65–82. Retrieved from <https://tinyurl.com/y7y9gxz4>
- Rasch, G. (1980). *Probabilistic models for some intelligence and attainment tests*. Chicago, IL: University of Chicago Press.
- Ravaja, N., Somervuori, O., & Salminen, M. (2013). Predicting purchase decision: The role of hemispheric asymmetry over the frontal cortex. *Journal of Neuroscience, Psychology, and Economics*, 6(1), 1–13.
- Rigaux-Bricmont, B. (1982). Influences of brand name and packaging on perceived quality. In A. Mitchell (Ed.), *Advances in consumer research* (pp. 42–477). Ann Arbor, MI: Association for Consumer Research.
- Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion referenced test item validity. *Dutch Journal of Educational Research*, 2, 49–60.
- Ryu, K., Lee, H. R., & Kim, W. G. (2012). The influence of the quality of the physical environment, food, and service on restaurant image, customer perceived value, customer satisfaction, and behavioral intentions. *International Journal of Contemporary Hospitality Management*, 24(2), 200–223. <http://dx.doi.org/10.1108/09596111211206141>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <http://dx.doi.org/10.5116/ijme.4dfb.8dfd>
- Underwood, R. L. (2003). The communicative power of product packaging: Creating brand identity via lived and mediated experience. *Journal of Marketing Practice and Theory*, 11(1), 62–76. <http://dx.doi.org/10.1080/10696679.2003.11501933>
- United Nations Environmental Programme. (2009). *The role of supply chains in addressing the global seafood crisis*. Paris, France: United Nations Environmental Programme. Retrieved from <http://tinyurl.com/kj8dwpb>
- Upshaw, L. N. (2000). *Building brand identity*. New York, NY: John Wiley & Sons.
- Wang, E. S. (2013). The influence of visual packaging design on perceived food product quality, value, and brand preference. *International Journal of Retail and Distribution Management*, 41(10), 805–816. <https://doi.org/10.1108/IJRDM-12-2012-0113>
- Yaklai, P., Suwunnamek, O., & Srinuan, C. (2017). Effects of intellectual capital and knowledge management on Thai food industry innovation: A conceptual perspective. *Asian International Journal of Social Sciences*, 17(1), 55–98. <https://doi.org/10.29139/aijss.20170103>
- Yoo, B., Donthu, N., & Lee, S. (2000). An examination of selected marketing mix elements and brand equity. *Journal of the Academy of Marketing Science*, 28(2), 195–211. <https://doi.org/10.1177/0092070300282002>