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Interplay of Food Labeling on Consumer Purchasing Behavior: Structural Equation Modeling Approach

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***Abstract*: Food labeling is considered to be a very significant public health strategy designed to give customers information that may affect their purchasing decisions. The purpose of this study was to evaluate how consumers made decisions regarding the critical information on food labels. Data was collected using a structured questionnaire distributed using online platform survey consist of 4 sections; demographic profile, food labeling, consumers' attitude, and consumers' purchasing behavior. Descriptive statistics was used for the demographic results of the respondents using SPSS. Results showed on the 213 respondents that 114 or 53.5 % are female, 144 or 67.7% are on the age group 21-30 years old, 151 or 70.9% are with bachelor's degree, and 127 or 59.6% are employed. In addition, SPSS was used in assessing the respondents in terms of the constructs on food labeling; product name, ingredients, net content, expiration date/consume before date, and nutritional facts. Moreover, Partial Least Square – Structural Equation Modeling (PLS – SEM) approach was used to test the hypotheses of the study using the software WarpPLS. In conducting hypotheses testing, it was first tested using confirmatory factor analysis and validity checks including the convergent validity, reliability measures, and discriminant validity. The results showed all passed the threshold limits. The study was then subjected to a second-order (higher-order) construct specifically on food labeling. In line with this, the results showed that there is a significant and positive relationship between the nutritional facts on food labeling and consumers' purchasing behavior. It was then concluded that, nutritional label affects the purchasing behavior mainly because the consumers want to avoid the adverse nutrients in food products.**

***Keywords*: Consumers' attitude, consumers' purchasing decision, food labeling, PLS – SEM approach.**

1. Introduction

Food is defined as anything eaten or drunk that meets the need for energy, body building, regulation, and protection of the body or sustain the life of the consumers. According to the World Health Organization (WHO), the key to sustaining life and promoting good health comes from the access to sufficient, safe, and nutritious food. Food that contains any harmful bacteria or living organism causes more than 200 diseases that can lead to serious illnesses in the long run. In 1992 by Beck, food safety is recognized as an acceptance attribute by which consumers cannot observed before and after purchasing the product.

Consumption habits have shifted dramatically in recent years. Consumers are becoming increasingly aware of food-related issues and their implications for the economy and the environment. According to Aprile (2012), a lack of information between producers and consumers may prevent consumers from making wise decisions about their purchases and from understanding the effects of those choices. According to Bacarella et. al (2015), elaborated the studies related to the food labels as a tool for consumers to acquire additional information about products for their purchase decision and there is a relationship between the objective characteristics of the food label and the consumer reactions.

The Administrative Order No. 2014-0030 or otherwise known as the Revised Rules and Regulations Governing the Labeling of Prepacked Food Products (FDA Labeling Regulations issued by the Philippines' Food and Drug Administration (FDA). In any food products, product labeling is the most readily available information about the food to inform the consumers.

Also, the FDA strictly informs any manufacturer not only to comply with the requirements but to ensure that the consumer is well informed on the nature of the product before it is purchased or informed.

Food labeling is increasingly considered a crucial component of comprehensive strategies to tackle unhealthy diets and associated chronic diseases. Food labels are regarded as a possible tool to empower consumers and to facilitate food choices. Thus, the objective of food labeling is to provide consumers with sufficient information, which may affect their purchasing behavior Caswell and Padberg (1999). In a study conducted by the Food Safety Authority of Ireland (2009), it was to establish whether the consumers understand the food labels presented on the packaging and whether it help consumers to make purchasing decisions.

The purpose of this study was to determine and assess what is the demographic profile of the respondents in terms of sex, age, educational attainment, and occupation, the assessment of the respondents in terms of the Food Labeling (product name,

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ingredients, net contents, expiration date/use-by-date/consume before date, and nutrition facts), the assessment of the respondents in terms of the consumers' attitude, and to determine the interplay of food labeling on consumers' purchasing behavior.

2. Literature Review

A. Food Labeling

Product labeling identifies any text, information, details, trademarks, brand names, visual content, or symbol related to a food. It must be included on any packaging, document, notice, label, ring, or collar accompanying or referring to such product and offers helpful details regarding the nutritional value and food safety, including identifying ingredients that may trigger an allergic reaction in the customer. Food and nutritional decisions and food information must be clear and understandable. It must not mislead the consumer, especially by mentioning features or properties that are not present in the food. The name of the food, the list of ingredients, the net quantity, the instructions for use, and, if applicable, the name and address of the Food Business Operator (FBO) and the nutrition declaration, the date of minimum durability or the "use by" date, and the date of freezing, in the case of frozen food, are all mandatory indications. (Marcotrigiano et al., 2018)

B. Consumers' Attitude

The Theory of Reasoned Action (TRA) investigates the role of attitudes in consumer purchasing intentions. Beliefs, attitudes, intentions, and behaviors are all linked in this theory. Intention is the most accurate predictor of behavior. However, judgments can be made for a variety of reasons, not always based on intention. According to the theory, attitudes have a small but significant influence on only three things, such as behavior, which is largely determined by a specific attitude toward something rather than a general attitude. Second, attitudes and subjective norms or beliefs both have an impact on behavior. Third, an attitude toward a shared behavior of subjective norms constitutes an intention, or an intention to behave in a particular way. (Fahmi et al., 2017)

C. Consumers' Purchasing Behavior

According to Shankar (2019), a study of consumer attitudes toward food labeling and perception of the Healthier Choice Logo (HCL) demonstrates that it has some influence on purchasing behavior. The study's findings concluded that providing appropriate food and nutrition information to the public is critical in the fight against serious illnesses. It was also discovered that food labeling has an impact on consumer purchasing decisions and may aid in food selection.

A study on the usage and understanding of food and nutritional labels among Indian consumers discovered that food labels play a significant role in a customer's first-time purchase of a product. Nutritional labels are developing a suitable policy for imparting nutrition education; consumers should be made aware of the relationship between diet, health, and disease; initiatives should be taken at the school education level; and nutritional labels should be consumer- friendly with simple terminology for better usage. (Abdul Latiff et al., 2016)

D. Hypotheses Development

In the theory of Ajzen (1991) called the Theory of Planned Behavior explains three independent factors determines a person's behavior such as attitude, subjective norms, and perceived behavioral control. It provides the structures in determining consumers' attitude by relating the existence of the food labels on the intention of purchasing the food products.

According to Latiff (2015) suggests that the attitude of consumers towards food labels are made up of their beliefs and consciousness about the labels attached to food products, their feeling of the food and the behavioral outcome that can be linked to the person's purchasing decision. In addition, labeling in which the attitude of the consumers can be said to influence purchasing decision.

Figure 1. shows the research framework which focus is to find the relationship between the components of food labeling, such as the product name, ingredients, net content, expiration date/consume before date, and the nutritional facts, the consumers' attitude that influence the consumers' purchasing intention. Six hypotheses were formulated to identify the relationship between the food labeling components and purchase intention.

Hypothesis 1:

Product name on food labels will have a positive influence on the consumers' attitude towards purchasing behavior.

Hypothesis 2:

Ingredients on food labels will have a positive influence on the consumers' attitude towards purchasing behavior.

Hypothesis 3:

Net contents on food labels will have a positive influence on the consumers' attitude towards purchasing behavior.

Hypothesis 4:

Expiration Date/Use-by-date/Consumer before date on food labels will have a positive influence on the consumers' attitude towards purchasing behavior.

Hypothesis 5:

Nutritional facts on food labels will have a positive influence on the consumers' attitude towards purchasing behavior.

Hypothesis 6:

Consumers' attitude has significant relationship on consumers' purchasing intention with regards to food labeling.

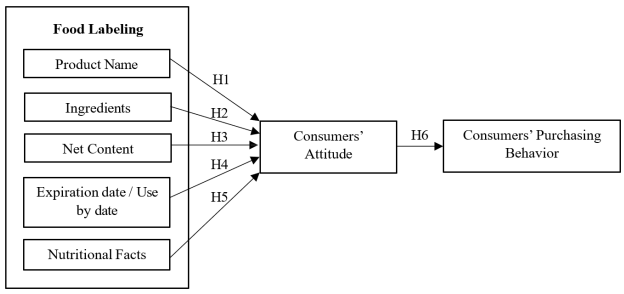

Fig. 1. Research framework

3. Research Method

A. Research Instrument

The structured questionnaire adapted from Abdul Latiff et al., (2016) was distributed using online survey platform (Google forms) consists of the demographic profile of the respondents in terms of the sex, age group, educational attainment, and occupation. Next, was the 35 questions answerable using the 5-point Likert scale; 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, and 1=Strongly Disagree. In a study of Ibitoye et. al (2014), 5-point Likert scale was used to determine the factors influencing the consumers' purchasing behavior.

To ensure the questionnaire was easy to comprehend and acceptable by the respondents, pre-survey was first conducted on 50 respondents. Table 1 shows the questionnaire was reliable with the respondents having Cronbach's Alpha of 0.745. This is greater than the Cronbach's Alpha value of 0.70. Moreover, the data was clean using the SPSS software and afterwards test the reliability of the 213 respondents. Table 2 shows the result with a Cronbach's Alpha of 0.868 that is greater than the value of 0.70.

Descriptive analysis was used for the demographic profile of the respondents of this study. This includes the sex, age, educational attainment, and occupation. Partial Least Square – Structural Equation Modeling (PLS – SEM) was then used for the hypotheses testing due to its powerful provision of visual representations that specifies the model's constructs, indicator variable, and interrelationship. The structural model represents a set of one or more dependence relationship linking the model's hypothesized constructs. Moreover, PLS- SEM is used to test the model fit, hypotheses on individual path or regression weights. Therefore, it was then first tested using the confirmatory factor analysis and subject to series of validity checks including the convergent validity and reliability measures and discriminant validity using the Fornell and Larcker Criterion and Heterotrait-monotrait. (Henseler, 2015)

Table 1
Checking for the reliability of n=50 respondents (pre-survey)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.745	35

Table 2
Checking for the reliability of n=213 respondents

Reliability Statistics	
Cronbach's Alpha	N of Items
0.868	35

B. Participants

The participants of the study are of any age and have had the experience to purchase food related products. WarpPLS 7.0 (Knock, 2020) was used to determine the required or minimum sample size to conduct the study. Based on the structural model and figure 2, the minimum absolute significant path coefficient of 0.197, significance level of 0.05, and power level required of 0.80 shows the minimum required sample must be between 146 (Gamma-exponential method) and 160 (Inverse square root method). The study was able to obtain 213 respondents signifying a stronger result on the hypotheses.

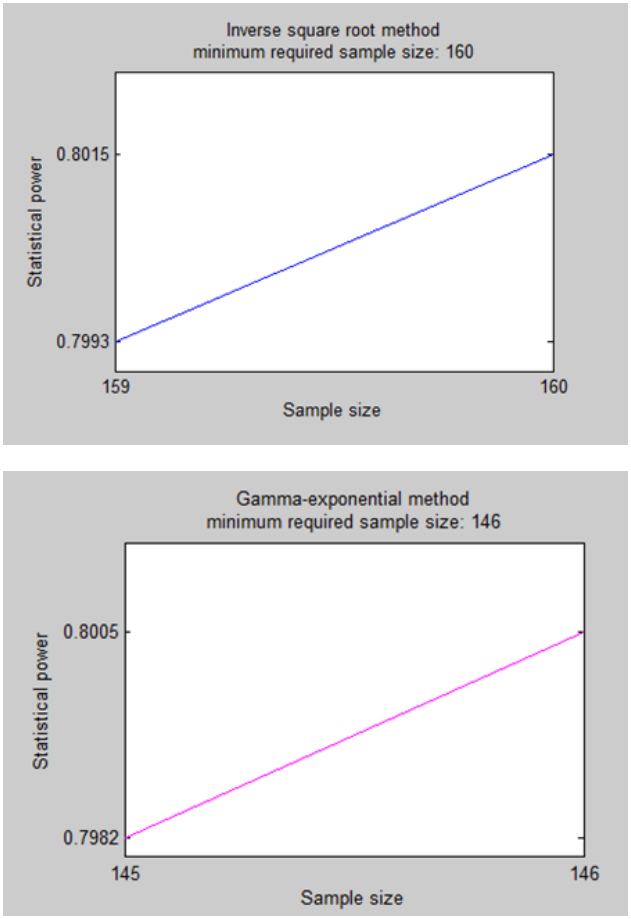

Fig. 2. Results of sample size power analysis using gamma exponential and inverse square root methods

4. Results

Table 3 shows the respondents' demographic results. A total of 213 respondents, 99 or 46.5% are male and 114 or 53.5% are female. The results show that 16.9% of the respondents are within the age group of 14 – 20 years old, 67.9% are 21 – 30 years old, 4.2% are 31 – 40 years old, and 11.3% are 41 years old and older. The study indicates that the major interest in terms of food labeling comes from the age of 21 – 30 years old respondents.

In terms of the educational attainment of the respondents, 2.8% are high school graduates, the majority with 70.9% are with bachelor's degree, 2.8% are with master's degree, and the remaining 23.5% are undergraduate. It indicates that respondents with bachelor's degree or college degree concerns on the food labeling aspects.

The results also showed that 25.8% are students, the majority (59.6%) are employed, 8.9% are self-employed, and the remaining 5.6% are unemployed. The research indicates that employed respondents consider the importance of food labeling.

This supports the study of Amari (2022) that the number of women was significantly higher compared to those in men and the majority of the respondents came from aged 20-29 years old

when it comes to the knowledge of information on food labels. It showed that females are more likely than men to use food labels and as the age increases, the probability of using food labels decreases. The results of demographic profile of the respondents in terms of educational attainment and occupation was also supported by the study of Bazhan et al., (2015) having the majority of the respondents were holders of a diploma and employed. The results suggest that consumers with more years of education may have greater nutritional interest.

Table 3
Respondents' demographic results

Demographics	Frequency	Percent
Sex		
Male	99	46.5%
Female	114	53.5%
Age Group		
14 - 20 years old	36	16.9%
21 - 30 years old	144	67.6%
31 - 40 years old	9	4.2%
41 years old - up	24	11.3%
Educational Attainment		
High School graduate	6	2.8%
Bachelor's Degree	151	70.9%
Master's Degree	6	2.8%
Undergraduate	50	23.5%
Occupation		
Student	55	25.8%
Employed	127	59.6%
Self - employed	19	8.9%
Unemployed	12	5.6%

Table 4 shows the results of the assessment of the respondents in terms of product name on food labeling. The composite mean of 4.06 agreed on the overall assessment of the respondents on product name with standard deviation of 0.85. The variable FL3 (Product name earns the loyalty of the customers) received the greatest mean of 4.14 and the lowest standard deviation of 0.762 indicating the stability of answers.

Table 5 shows the results of the assessment of the respondents in terms of ingredients on food labeling. The composite mean of 4.05 agreed on the overall assessment of the respondents on ingredients with standard deviation of 0.86. The variable FL9 (I prefer ingredients that will make me healthier) received the greatest mean of 4.17 and the lowest standard deviation of 0.746 indicating the stability of answers.

Table 6 shows the results of the assessment of the respondents in terms of the net content on food labeling. The composite mean of 4.17 agreed on the overall assessment of the respondents on net content with standard deviation of 0.85. The variable FL13 (I purchase the food product even though I do not understand its net content) received the greatest mean of 4.21 and the lowest standard deviation of 0.799 indicating the stability of answers.

Table 7 shows the results of the assessment of the respondents in terms of the date on food labeling. The composite mean of 4.20 agreed on the overall assessment of the respondents on date with standard deviation of 0.84. The variable FL19 (I prefer food products with an expiration date of 1 year or more) received the greatest mean of 4.28 and the lowest standard deviation of 0.742 indicating the stability of answers.

Table 8 shows the results of the assessment of the respondents in terms of the nutrition facts on food labeling. The composite mean of 3.95 agreed on the overall assessment of the respondents on nutrition facts with standard deviation of 0.87. The variable FL24 (Nutritional Facts helps consumers balance their food choices throughout the day) received the greatest mean of 4.03 and the lowest standard deviation of 0.803 indicating the stability of answers.

Table 9 shows the results of the assessment of the respondents on consumer's attitude towards food labeling. The composite mean of 4.09 agreed on the overall assessment of the respondents with standard deviation of 0.82. The variable CA3 (Regardless of other labels, I still consider the price) received the greatest mean of 4.31 and the lowest standard deviation of 0.712 indicating the stability of answers.

5. Analysis

Table 10 shows the convergent validity and reliability measures obtained from this study. In measuring the reliability

Table 4
Respondents' assessment on product name

Code	Indicators	Mean	Std. Deviation	Interpretation	Rank
	Food Labeling				
	Product Name				
FL1	1. Product name can create awareness on the quality of food product.	4.04	0.854	Agree	4
FL2	2. Branding recognizes a food product.	4.06	0.972	Agree	3
FL3	3. Product name earns the loyalty of the customers.	4.14	0.762	Agree	1
FL4	4. Product name creates future marketing strategies.	4.14	0.782	Agree	2
FL5	5. Product name has an impact on the demand of food product.	3.93	0.893	Agree	5
	Composite Mean	**4.06**	**0.85**		

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20-5.00=Strongly Agree (Pimentel, 2010)

Table 5
Respondents' assessment on ingredients

Code	Indicators	Mean	Std. Deviation	Interpretation	Rank
	Ingredients				
FL6	1. Ingredient label can create the awareness of the food product quality.	4.00	0.911	Agree	5
FL7	2. I sometimes have difficulties to understand scientific terms related to ingredient label.	4.01	0.988	Agree	3
FL8	3. An ordinary person should easily understand the ingredient label.	4.09	0.825	Agree	2
FL9	4. I prefer ingredients that will make me healthier.	4.17	0.746	Agree	1
FL10	5. I purchase the food product even though I do not understand its ingredients.	4.00	0.833	Agree	4
	Composite Mean	**4.05**	**0.86**		

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20-5.00=Strongly Agree (Pimentel, 2010)

Table 6
Respondents' assessment on net content

Code	Indicators	Mean	Std. Deviation	Interpretation	Rank
	Net Content				
F11	1. I have knowledge on the net content on food label.	4.13	0.836	Agree	4
F12	2. Net content should be visible on food labels.	4.18	0.974	Agree	3
F13	3. I purchase the food product even though I do not understand its net content.	4.21	0.799	Strongly Agree	1
F14	4. I know that the net content determines the price of the food product.	4.19	0.854	Agree	2
F15	5. I prefer product with higher net content.	4.12	0.801	Agree	5
	Composite Mean	**4.17**	**0.85**		

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20 5.00=Strongly Agree (Pimentel, 2010)

Table 7
Respondents' assessment on expiration date/use-by-date/consume before date

Code	Indicators	Mean	Std. Deviation	Interpretation
	Expiration date/use-by-date/consume before date			
F16	1. I can understand and know how to read the expiration date on food labels.	4.19	0.837	Agree
F17	2. Expiration date/Use-by-date/Consume before date can create awareness on the quality of food in terms of its shelf life.	4.20	0.995	Strongly Agree
F18	3. I still purchase food product with an expiration date of 1 week after I purchased.	4.17	0.808	Agree
F19	4. I prefer food products with an expiration date of 1 year or more.	4.28	0.742	Strongly Agree
F20	5. Expiration date/Use-by-date/Consume before date gives me the assurance of the taste of the product.	4.14	0.816	Agree
	Composite Mean	**4.20**	**0.84**	

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20-5.00=Strongly Agree (Pimentel, 2010)

Table 8
Respondents' assessment on nutrition facts

Code	Indicators	Mean	Std. Deviation	Interpretation	Rank
	Nutrition Facts				
F21	1. I prefer to purchase nutritional product.	3.95	0.857	Agree	3
F22	2. I believe checking nutrition label can lead me to a healthier choice.	3.89	0.989	Agree	5
F23	3. I understand and know how to read nutritional facts on food label.	3.95	0.842	Agree	2
F24	4. Nutritional Facts helps consumers balance their food choices throughout the day.	4.03	0.803	Agree	1
F25	5. Nutritional facts helps in keeping better eating habits and in maintaining a healthy balanced diet.	3.92	0.859	Agree	4
	Composite Mean	**3.95**	**0.87**		

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20-5.00=Strongly Agree (Pimentel, 2010)

Table 9
Respondents' assessment on consumer's attitude towards food labeling

Code	Indicators	Mean	Std. Deviation	Interpretation	Rank
	Nutrition Facts				
CA1	1. Food products with nutritional label are more expensive.	4.00	0.895	Agree	4
CA2	2. I believe the higher the price indicates the better quality of product	4.15	0.760	Agree	2
CA3	3. Regardless of other labels, I still consider the price.	4.31	0.712	Strongly Agree	1
CA4	4. I purchase a well-known brand for safety purposes.	3.86	0.974	Agree	5
CA5	5. I prefer food product with lower price regardless of the indicated nutritional facts.	4.11	0.737	Agree	3
	Composite Mean	**4.09**	**0.82**		

Legend: 1.00-1.79=Strongly Disagree; 1.80-2.59=Disagree; 2.60-3.39=Neutral; 3.40-4.19=Agree; 4.20-5.00=Strongly Agree (Pimentel, 2010)

of the constructs, composite reliability (CR) and Cronbach's alpha (CA) were measured. According to (Fornell & Larcker, 1981; Nunnally, 1978; Nunnally & Bernstein, 1994), in assessing the reliability of a construct using CA and CR, the threshold limit must be equal of higher than 0.7. The table below demonstrates all constructs or items – product name (CR=0.880, CA=0.830), ingredients (CR=0.880, CA=0.828), net content (CR=0.869, CA=0.810), expiration date/use-by-date/consume before date (CR=0.866, CA=0.806), nutritional facts (CR=0.884, CA=0.835), consumers' attitude (CR=0.867, CA=0.806), and consumers' purchasing behavior (CR=0.923, CA=0.895).

The item loading of each latent variable and its corresponding average variance extracted (AVE) were also shown on Table 10. According to Hair et. al (2010), factor loading estimates and AVE should be higher than 0.5 Based on the results, all the latent variable or the constructs passed the requirement for convergent validity.

Table 11 shows the discriminant validity using the Fornell-Larcker criterion. The assessment of discriminant validity is important in any research that involves latent variables for the prevention of multicollinearity issues. According to Fornell & Larcher (1981), the square root of AVE of each construct should be greater than the correlation with any other construct in the framework. In addition, the cross-loadings of each item associated with the construct should be greater than the loading on other constructs. (Chin, 1998).

Table 12 demonstrates the Heterotrait-Monotrait (HTMT) Ratios. According to Henseler, Ringle, & Sarstedt (2015), to pass the discriminant validity, it must be with threshold of <0.85 or <0.9. Based on the results, the maximum value of construct is 0.751 that established a discriminant validity for the model.

Table 13 shows the Model Fit and Quality Indices with a coefficient value of APC (0.225, P<0.001), ARS (0.307, P<0.001), AARS (0.296, P<0.001) resulting to an acceptable

decision. In addition, the AVIF and AFVIF are both ideal with 1.075 and 1.415 coefficient value respectively. Moreover, the cut-off values for assessing the results of the GoF analysis is reported as small >= 0.1, medium >= 0.25, large >= 0.36 (Ali et al. 2016). The obtained value is 0.430 that indicates that the model is large fit.

Table 10
Convergent validity and reliability measures

Constructs/Item	Item Loading	AVE	CR	CA
Food Labeling				
Product Name				
PN1	0.771	0.596	0.880	0.830
PN2	0.783			
PN3	0.836			
PN4	0.729			
PN5	0.737			
Ingredients				
ING1	0.787	0.594	0.880	0.828
ING2	0.768			
ING3	0.832			
ING4	0.735			
ING5	0.727			
Net Content				
NC1	0.803	0.573	0.869	0.810
NC2	0.795			
NC3	0.838			
NC4	0.606			
NC5	0.719			
Expiration date/use-by-date/consume before date				
ED1	0.791	0.564	0.866	0.806
ED2	0.792			
ED3	0.774			
ED4	0.709			
ED5	0.683			
Nutrition Facts				
NF1	0.757	0.604	0.884	0.835
NF2	0.773			
NF3	0.835			
NF4	0.733			
NF5	0.783			
Consumers' Attitude				
Behavioral				
Outcome				
CA1	0.533	0.572	0.867	0.806
CA2	0.822			
CA3	0.778			
CA4	0.797			
CA5	0.812			
Consumers' Purchasing Behavior				
Purchase Behavior				
CPB1	0.811	0.705	0.923	0.895
CPB2	0.849			
CPB3	0.838			
CPB4	0.862			
CPB5	0.839			

PN-product name; ING-ingredients; NC-nutritional content; ED-expiration date/use by consumer date; NF- nutritional facts; CA-consumer's attitude; CPB-consumer purchasing behavior

Figure 3 and Table 14 present the results on the analysis of the hypotheses testing. It shows that product name (β= 0.140, p=0.019), ingredient (β=0.144, p=0.016) and nutritional facts (β= 0.367, p<0.001) are significantly and positively related to consumers' attitude with moderate effect size of PN(f^2= 0.023), ING(f^2= 0.019), and NF(f^2=0.140). The results indicate that the product name, ingredients, and nutritional facts on food labeling influence the consumer's attitude. Hence, H1, H2 and H5 are supported. The other variables net content (β= 0.041, p=0.272) and expiration date/consume before date (β=-0.006, p=0.467) are not significantly related to consumer's attitude. Hence, H3 and H4 are not supported.

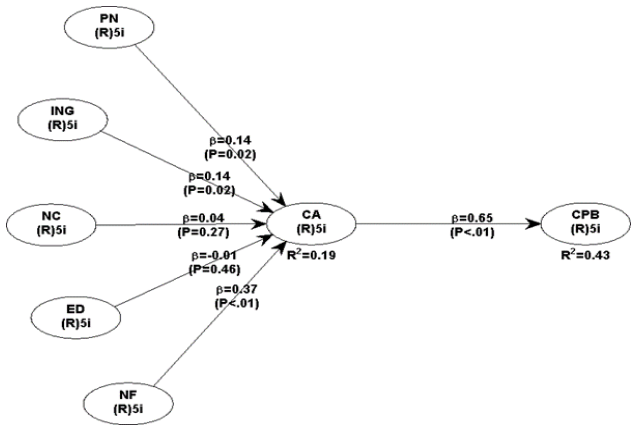

Fig. 3. The structural model with parameter estimates

Table 11
Discriminant validity using Fornell-Larcker criterion on reflective constructs

	PN	ING	NC	ED	NF	CA	CPB
PN	0.772	0.286	0.240	0.371	0.142	0.136	0.054
ING	0.286	0.771	0.215	0.455	-0.067	0.033	-0.005
NC	0.240	0.215	0.757	0.325	0.203	0.145	0.100
ED	0.371	0.455	0.325	0.751	0.111	0.047	-0.008
NF	0.142	-0.067	0.203	0.111	0.777	0.321	0.288
CA	0.136	0.033	0.145	0.047	0.321	0.756	0.640
CPB	0.054	-0.005	0.100	-0.008	0.288	0.640	0.840

PN-product name; ING-ingredients; NC-nutritional content; ED-expiration date/use by consumer date; NF- nutritional facts; CA-consumer's attitude; CPB-consumer purchasing behavior

Moreover, in terms of the relationship of consumer's attitude and consumer's purchasing behavior, it was found out that these two constructs are significantly and positively related to one another (β= 0.654, p<0.001). Hence, H6 is supported.

Measurement model assessment using variance inflation factor (VIF), outer weight and the corresponding p-value, and full collinearity were measured for the second-order (higher-order) construct food labeling. This is according to Edwards, 2001; Johnson et al., 2011; Polites et al., 2012 that can help to reduce the number of path model relationships and thus achieving tightness of the model.

Table 15 reveals the results for the higher order formative constructs such as the factor weight, p-value, VIFs, and the full collinearity VIF. According to Diamantopoulos and Siguaw (2006), the threshold for VIF is equal to or lower than 3.30. It can be shown on Table 15 that all constructs passed the criterion. In terms of the outer weight or the p- value, it must have a value of equal to or less than 0.05 (Ramayah et al., 2018), and all the constructs of food labeling passed the required threshold limits.

Full collinearity VIF was measured in assessing the discriminant validity of the second-higher construct (food labeling), this is according to Rasoolimanesh et al. (2017). In determining the possible collinearity, the value of full collinearity VIF must be equal to or less than 3.30 (Kock, 2015; Kock & Lynn, 2012). And the results reveal that food labeling

has no collinearity with a value of 1.028.

Table 12
Discriminant validity using HTMT ratios of reflective constructs

	PN	ING	NC	ED	NF	CA	CPB
PN							
ING	0.347						
NC	0.286	0.264					
ED	0.450	0.553	0.398				
NF	0.186	0.129	0.252	0.173			
CA	0.173	0.110	0.189	0.098	0.422		
CPB	0.082	0.083	0.117	0.082	0.335	0.751	

PN-product name; ING-ingredients; NC-nutritional content; ED-expiration date/use by consumer date; NF- nutritional facts; CA-consumer's attitude; CPB-consumer purchasing behavior

6. Discussion

The results of the study reveals that net content and expiration date/consumer before date does not significantly influence the consumer's attitude. It suggests that consumer's do not consider these constructs on purchasing food products. Also, it was found out on the results that product name, ingredients and nutritional fats significantly and positively influence the consumer's attitude. The findings confirm a research by Shine et al. (1997) that found consumers are becoming more aware of the importance of nutrition. The study also demonstrates a substantial association between dietary views and food product nutritional content, with a higher proportion of label-readers expressing strong agreement with nutritional qualities. The study also shows a strong correlation between perceived knowledge level, knowledge of the nutrients' components, and labelling.

The findings also present that consumers' attitude is significantly and positively influence the consumer purchasing behavior with regards to food labeling. The outcome is consistent with the study by Swetha (2021), which found that nutritional labeling had a favorable impact on customers' purchase decisions and can encourage them to eat healthier. Additionally, according to the research by Anand Shankar Raja et al. (2019), labels have a significant impact on customers' purchase decisions, especially those who care about their health.

7. Study Implications, Limitation, and Future Research Directions

The research study investigates the relationship of food labeling and consumer's attitude and the interplay to consumer's purchasing behavior. Based on the results and hypotheses testing using WarpPLS, the research study concluded that the variable product name, ingredients and nutritional facts on food labeling significantly and positively influence the consumer's purchasing behavior. In connection to the results, it reveals that consumers are more interested on the nutritional and health benefits of food products. According to Azman & Sahak (2014) nutritional label significantly affect the consumers' purchasing behavior and the provision of nutrition information may allow consumers to switch consumption of food products.

Customers are now concerned with the nutritional content of packaged foods sold in retail establishments in addition to the appearance of the products. The customer will be helped to make healthier decisions by the nutritional label provided. In general, it has been discovered that the usage of nutritional

Table 13
Model fit and quality indices

Model fit	Coefficients	Decision
Average path coefficient (APC)	0.225, P<0.001	Acceptable
Average R-squared (ARS)	0.307, P<0.001	Acceptable
Average adjusted R-squared (AARS)	0.296, P<0.001	Acceptable
Average block VIF (AVIF)	1.075, acceptable if <= 5, ideally <= 3.3	Ideally
Average full collinearity VIF (AFVIF)	1.415, acceptable if <= 5, ideally <= 3.3	Ideally
Tenenhaus GoF (GoF)	0.430, small >= 0.1, medium >= 0.25, large >= 0.36	Large

Table 14
Results of direct effects

Hypothesis	Path coefficient (β)	p-value	Standard error (SE)	Effective size (f^2)	Interpretation
Direct effects					
H1. PN → CA	0.140	0.019	0.067	0.023	Significant
H2. ING →CA	0.144	0.016	0.067	0.019	Significant
H3. NC → CA	0.041	0.272	0.068	0.006	Not significant
H4. ED → CA	-0.006	0.467	0.068	0.001	Not significant
H5. NF →CA	0.367	<0.001	0.064	0.140	Significant
H6. CA →CPB	0.654	<0.001	0.061	0.427	Significant

PN-product name; ING-ingredients; NC-nutritional content; ED-expiration date/use by consumer date; NF- nutritional facts; CA-consumer's attitude; CPB-consumer purchasing behavior

Table 15
Measurement model assessment for higher order formative constructs

Higher Order Formative Constructs	Factor Weight	p-value	VIF	Full Collinearity VIF	Interpretation
Food Labeling				1.028	
PN	-0.339	<0.001	1.217		
ING	-0.337	<0.001	1.327		No collinearity and no common bias
NC	-0.312	<0.001	1.180		
ED	-0.397	<0.001	1.448		
NF	-0.134	0.023	1.082		

PN-product name; ING-ingredients; NC-nutritional content; ED-expiration date/use by consumer date; NF- nutritional facts

labels influences customers' buying decisions mostly because they desire to steer clear of harmful elements in food goods.

Several studies have proved that the nutritional label or facts changes the consumer buying patterns. Findings from the research of Schupp et al. (1998) that existence of nutritional label in meat product changes the attitudes of the consumers. In the study of Rimal & Fletcher (2003), shows that the use of nutritional label also influences the customer especially the female respondents in choosing healthier products. In line with the results and other related studies, it can be concluded that the use of nutritional label can influence the consumption of food products. It can also manage the consumption pattern of the consumers.

The survey study was conducted on the 213 respondents mostly located at the Province of Tarlac through the use of online survey platform. Thus, it is suggested for future research studies to increase the number of respondents and expand the locale. It is proposed to add more additional variables or constructs related to food labeling, consumers' attitude and consumers' purchasing behavior.

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