



## STUDI POLA KONSUMSI TEH DI INDONESIA UNTUK MENDUKUNG DIVERSIFIKASI PRODUK YANG BERKELANJUTAN

*(A Study of Tea Consumption Pattern in Indonesia Toward Sustainable Product Diversification)*

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Diterima 03 Juli 2020, Revisi akhir 04 Desember 2020, Disetujui 05 Desember 2020

**ABSTRAK.** Penelitian mengenai eksplorasi perspektif konsumen terhadap persyaratan produk teh telah menjadi perhatian dunia, seiring dengan meningkatnya permintaan konsumen dan daya saing pasar. Khususnya di Indonesia, kebutuhan pasar yang lebih luas dan kebijakan pemerintah yang relevan terhadap pertimbangan lingkungan membuat masalah ini juga perlu ditangani secara signifikan. Penelitian ini memiliki tujuan untuk menganalisis pola konsumsi teh di Indonesia untuk mendukung diversifikasi produk yang berkelanjutan. Desain penelitian dilakukan dengan menggunakan metode survei. Kuesioner dikembangkan menggunakan wawancara terstruktur, dengan jumlah responden sebanyak 188 orang. Survei ini mengakomodasi teh secara umum, seperti teh hijau, teh putih, teh hitam, dan lain-lain. Hasil penelitian menunjukkan preferensi responden terhadap teh yang paling dominan adalah jenis teh celup (57,45%), teh serbuk (28,19%) dan teh siap minum (14,36%). Responden dengan usia 31-40 tahun paling banyak mengonsumsi teh setiap hari (1,90 gelas.hari<sup>-1</sup>). Sebanyak 78,19% responden memilih konsumsi teh tawar setiap hari, diikuti oleh teh dengan susu 12,23% dan teh dengan krim 9,57%. Hasil analisis lebih lanjut menggunakan Likelihood Ratio Test, didapatkan bahwa antara variabel usia, jenis kelamin dan pekerjaan tidak terdapat pengaruh yang signifikan dalam pemilihan jenis teh.

**Kata kunci:** diversifikasi produk, industri berkelanjutan, pola konsumsi, preferensi, teh

**ABSTRACT.** Research to explore consumer perspective toward tea product requirements has been being emphasized around the globe, as well as the advancing variety of consumer demand and market competitiveness. Particularly in Indonesia, broader market needs and government relevant policies toward environmental consideration made these issues also need to be significantly addressed. This study aimed to analyze tea in consumption patterns Indonesia to support diversified sustainable products. The research design was conducted using survey method. A questionnaire was developed using structured interviews, with the number of respondents as many as 188 people. This survey was accommodating general type of tea such as green tea, white tea, black tea, etc. The result showed that respondents' preferences toward tea belong to tea bags the most, with percentage 57.45%, powdered tea 28.19% and ready to drink tea 14.36%. Respondents age of 31-40 years old most widely consumed tea everyday (1.90 cup.day<sup>-1</sup>). As many as 78.19% of respondents were chose to consumed plain tea, followed by milk added tea 12.23% and creamer added tea 9.57%. Further analysis using the Likelihood Ratio Test showed that age, gender and occupation factors were not a significant factor in the variety of tea types. To support the sustainable tea industry consumer behavior is also very important to be studied because consumers usually ask for high production standards but with a cheap cost.

**Keywords:** consumption pattern, preference, product diversification, sustainable industry, tea

## 1. INTRODUCTION

Tea is the most widely consumed drink in the world since ancient times. Tea is planted more than 45 countries in the world (FAO, 2003); and one of them is derived from *Camellia sinensis* leaves. The first documented sources of tea appeared in China in the third century (Munday, 2016), but archaeological studies show that the first tea was consumed in the early Paleolithic period (Cooper, 2012). Globally, tea production was controlled by seven countries, namely Indonesia, India, China, Sri Lanka, Turkey, Kenya, and Vietnam (Schramm, 2013; Soheilifard *et al.*, 2018). According to Smith (2018) in Industry Today Article, the global tea market is segmented into product types as follows: leaf tea (green tea, black tea, oolong tea), CTC tea (crush, tear, curl) and others (herbal tea, flavored tea). Changing the consumption style of tea provide an opportunity to the tea industry due to the growing middle level and urbanized population of many emerging and developing markets. Among product types, black tea and green tea segments are expected to grow rapidly over in the future.

At the moment, tea consumption is increasing worldwide. This is due to the human consciousness of the benefits that contained in drinking tea. Those beneficial components are believed as anti-cancer, anti-diabetes, anti-inflammatory, anti-obesity, antioxidant and nerve protectors (Chen *et al.*, 2016; Dutta and Mohanakumar, 2015; Peluso and Serafini, 2017; Shahidi and Ambigaipalan, 2015; Xiang *et al.*, 2016; Yang and Wang, 2016). In line with the increasing consumption of tea worldwide, tea production worldwide is also arising (FAO United Nations, 2018).

Tea products are well known and favored by Indonesian people. Furthermore, Indonesia is known as the 10 biggest tea consumers globally (Euromonitor Research, 2017). Tea as a material drink is made yet from a young bud that has been through specific production processes such as the withering, milling, enzymatic oxidation and drying. Tea consumption level of Indonesian people is supported by high productivity in the country, providing an excellent opportunity for the development of the tea industry. Various types of tea products are served in a variety of forms ranging from powdered tea, bottled tea, tea bags, also tea bottles to tea boxes. Diversification of tea products by brand, type and different packaging will allow the consumers to choose a broader range of products.

The data of International Tea Committee showed the global consumption of tea trend always increasing year by year. In 2018, the global tea consumption reached 5.677 thousand metric tons. It increased by 13.9% from 2014 which was only 4.889 thousand metric tons. Apparent consumption of tea by Indonesia in 2018 reached out 94 million kg, ranked 10<sup>th</sup> in the world's largest consumption. The consumption of tea per capita in Indonesia from 2016 to 2018 was 0.36 kg/capita/year. This data increased by 0.02 kg/capita/year from 2015-2017 which was only 0.34 kg/capita/year (International Tea Committee, 2019). This increase in data shows the existence of sustainable tea consumer behavior. Based on survey by research and development division of Kompas (Kompas, 2020), tea consumer in Indonesia composed of 52.5% drink tea because of customs hereditary, 16.3% to add zest before doing activities, 14.5% because of beneficial to health, 15.1% do not like drink tea, 0.8% do not have the reason of drink tea and 0.8% don't answer. In Indonesia customs, heredity has a big impact for tea consumer behavior. For tea consumers, this commodity is considered to have a comparative advantage because it has some benefits, such as distinctive flavor and smell, does not cause specific effects when drunk and provides freshness after drinking. Besides that, the tea is effective for weight loss, giving the youthful power, able to prevent and cure some kinds of diseases (Eveline, 1997).

The perspective of consumer tea consumption patterns on a tea product is crucial to know the behavior of society. The consumers attitude toward tea product affect its behavior and action on the selection of tea products. Therefore, marketers are interested to know the consumers perspective to the tea products that are marketed so they can formulate strategies to influence the attitude of the consumers (Sumarwan, 2014). The benefits of the analysis of existing and circulating tea products, one of which helps to design new tea products. A systematic review of existing and similar tea products should be done before designing and producing new tea products. Consumer needs can be obtained by evaluating the current related tea products. Analysis of the look, taste, price and number of products that have been circulating is a particular concern by the product development team in tea industry (Mottershead and Woods, 2003). Research to explore consumer perspective toward tea product requirements has also been being emphasized around the globe. Particularly in Indonesia, broader market needs

and government relevant policies toward environmental consideration made these issues also need to be significantly addressed. Therefore, from all that has been described research on the pattern of consumption based on the tea perspective life cycle in Indonesia needs to be done.

## 2. METHOD

The research site was the City of Serpong, Tangerang Selatan, Banten, and Gambung Regency, Bandung. The interviews were conducted by questionnaires between July 2018 and February 2020, toward 51 youth (11-20 years old) and 137 adults (21-63 years old).

### Description of Research Procedure

Design of the study was conducted by survey method, with the number of respondents as many as 188 people. This survey was not specifically designated one kind of tea, but accommodating general type of tea such as green tea, white tea, black tea, etc. This research uses data collected in the form of primary and secondary data. Primary data collection was carried out following the method described by Singarimbun and Effendi (2006), Usman and Akbar (2014), Sekaran (2006), Zulganef (2008), Prasetya *et al.* (2016).

### Data Analysis

Relationship between respondent characteristics (age, gender and occupation) and respondent preference of tea were on statistically analyzed with program SPSS 20. This is done to minimize the research time and accuracy of the results obtained in the research. The data has been obtained from the field evaluated using several statistical tests.

### Descriptive statistic

Descriptive statistic is the presentation of data in the form of tables, graphic or lists to facilitate the observation and evaluation. Results of research are compiled in the form of tables and provide explanations using sentences on the presented data that has been obtained. The commonly used table types are frequency tables and graphic (Morissan, 2014).

### Independence test (chi-square)

The independency test was carried out using a table, so it is called a contingency table analysis or cross-tabulation. This contingency table is quite popular in research studies to analyze a cross-

tabulation to determine if two different attributes have each other (Morissan, 2014).

Formulated hypotheses are:

H0 = There is no connection between variable X and variable Y.

H1 = There is a connection between variable X and variable Y.

H0 is rejected when the chi-squared value counts > The value of the Chi-squared table or Value < 0.05.

### Multinomial logistics regression analysis

A logistical regression multinomial is a form of the model equation with link function in the kind where the response of nominal qualitative data with the number of categories more than two. Multinomial Logistic regression is an extension of binary (two classes). Multinomial Logistic regression is used if the dependent variable has more than two categories. Mathematically multinomial logistic regression can be explained as follows. If the dependent variable has a category M, one is considered a reference category. Probability categories compared to the probability of reference categories (Ghozali, 2013).

### Simultaneous testing

In simultaneous testing, likelihood ratio method was used simultaneous test hypotheses are as follows:

H0:  $1 = 2 = 3 = 0$

H1: At least one is not equal to zero

$j = 1, 2, 3, \dots, p$ .

H0 is rejected if the P-value is  $\leq \alpha$  (0.05), which means there are one or more of the more significant impact variables for the response.

### Partial test

A partial test is used for individual testing which indicates whether a variable is a significant free or feasible entry model. In multinomial logistics regression for partial testing, the coefficient of significance test can be used with the Wald formulated test (Gudono, 2012). The hypotheses used are:

H0: = 0 (statistically insignificant coefficient)

H1:  $\neq 0$  (statistically significant coefficient)

$J = 1, 2, \dots, P$

$p$  = Number of predictors in the model.

### Coefficient of determination

The coefficient of determination is used to identify the percentage of contributions percentage of independent variables (X1, X2, X3)

simultaneously against the dependent variable (Y). The value of Nagelkerke's R Square has a great interpretation of dependent variable variability that can be explained by independent variable variability. In logistical regression multinomial, the contribution percentage of the two variables can be known from the value of the Nagelkerke's coefficient (Ghozali, 2013).

### 3. RESULT AND DISCUSSION

#### Individual Characteristics

##### Age

There were two groups of respondents who have the larger number, which was the age group of 11-20 years and 21-30 years ( 27.13% respectively). The age group of 31-40 years has a presentation of 20.74%. The number of persons for each group was not same due to random method deployed for data collection. Composition of respondents are presented in Table 1.

Table 1. Age distribution respondent

Age (year)	Males		Females		Total	
	n	%	N	%	N	%
11-20	10	18.18	41	30.83	51	27.13
21-30	17	30.91	34	25.56	51	27.13
31-40	12	21.82	27	20.30	39	20.74
41-50	7	12.73	13	9.77	20	10.64
> 50	2	3.64	14	10.53	16	8.51
Not answer	7	12.73	4	3.01	11	5.85
Total	55	100	133	100	188	100

#### Socio-demographic characteristics

The number of respondents was 188, with details of 29.26% for male respondents and 70.74 % for female respondents. Table 2 showed that most respondents was a student (40.43 %), followed by a private-sector employees 28.72%. This data was obtained randomly from two places in Bandung and Tangerang Selatan, including from visitors of exhibition event who came to tea booth. Therefore, the number may vary greatly. For example, female was over double than male, while students represented as most of visitors.

Tea drink is defined as a drink obtained from the tea brew (*Camellia sinensis*) in drinking water with the addition of sugar, with or without additional food additives that are allowed and packaged resistant/hermetic (Badan Standardisasi Nasional, 2011). Tea is a soft drink that can be received by the whole layers, encouraging the development of tea industry. Tea is not only processed into dried tea leaves but undergo a further processing process

resulting in a more practical, easy to serve tea and a variety of flavors available. A variety of processed teas are offered: tea bags, powdered tea or in the form of ready-to-prepare tea in the package (Supriyasih, 2000).

Table 2. Socio-demographic characteristics of tea consumers

Characteristics	Frequency	%
<i>Gender</i>		
Males	55	29.26
Females	133	70.74
Total	188	100
<i>Occupation</i>		
Lecturer/ Teacher	16	8.51
Students	76	40.43
Civil Servants	32	17.02
Private sector employees	54	28.72
Self-employ	1	0.53
Not employ	9	4.79
Total	188	100

#### Consumer Tea in Indonesia

One of the efforts made by producers to increase tea consumption in Indonesia is offer tea-processed products that can be directly consumed by the public. In the early 80's, the tea bag product was introduced to the people of Indonesia. This product received a perfect reception, which was demonstrated by the rapid increase in the consumption of domestic tea bags (Spillane, 1992). Nowadays, people are slowly changing their consumption patterns from tea powder (packaged loosely) to tea bags.

The spread of respondents based on tea consumption exhibits the customer preference toward how tea should be served, whether in the form of tea bags, tea powder, and ready to drink tea. It is also apparent from the research results that almost 57.45% of respondents consumed tea bags. The use of powdered tea occupies a second order (28.19%) and the last is ready to drink tea (14.36%) (Figure 1). The respondent preference tea bags may be due to economic reason since tea bags is the cheapest among all per unit.

The results of this study showed that ready to drink tea is still rare for Indonesians to consumed. However, the growing age demanded practical products, one of them is a packaged tea product. According to the Indonesian Soft Drink Association (ASRIM), more common and appropriate packaged tea in Indonesia currently ranks second largest after bottled drinking water. According to ASRIM data of

the year 2014, the demand for tea drinks in packaging reached 2 billion liters, and there had been growing trend of bottled tea businesses in the last five years. The consumption of tea beverages in Indonesia year 2014 noted 1.07 pounds (the weight unit of tea leaves) per person in a year. However, this amount was still lower than other countries such as Malaysia, Turkey, the UK and New Zealand.

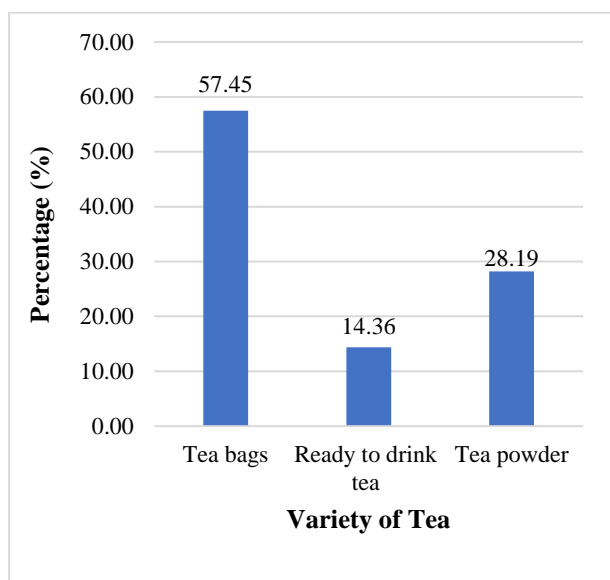


Figure 1. The spread of respondents based on tea consumption

According to research MARS Indonesia, tea has been consumed by more than 79% of the majority of the Indonesian population (MARS Indonesia, 2015). One of the factors that led to the growth of tea consumption is the presence of packaged tea. The packaged tea in Indonesia is in second place with sales volume growth of 44% and outperform carbonated soft drinks with sales volume growth of 14% (Euromonitor, 2014). The growth of packaged tea drinks increased from year to year. In the year 2010, the market share for ready to drink tea (RTD) reached 8.9%. The high potential of business and increasing trends, especially among young people and adolescents, have encouraged many industries to produce packaged tea product (Euromonitor, 2014).

After knowing the type of tea consumption in Indonesia, it is necessary to learn the age distribution of tea consumers to better understand the market target when developing a new tea product. The frequency of consumption of tea is one way to determine the pattern of use of tea and give an overview of how many times the respondent consumed it in one day. Based on the results of the study (Figure 2), respondents who had a 31 until 40

years old had the most substantial frequency in drinking tea (1.9 cups.day<sup>-1</sup>), and the lowest was respondents age of 11 until 20 years old (1.25 cups.day<sup>-1</sup>).

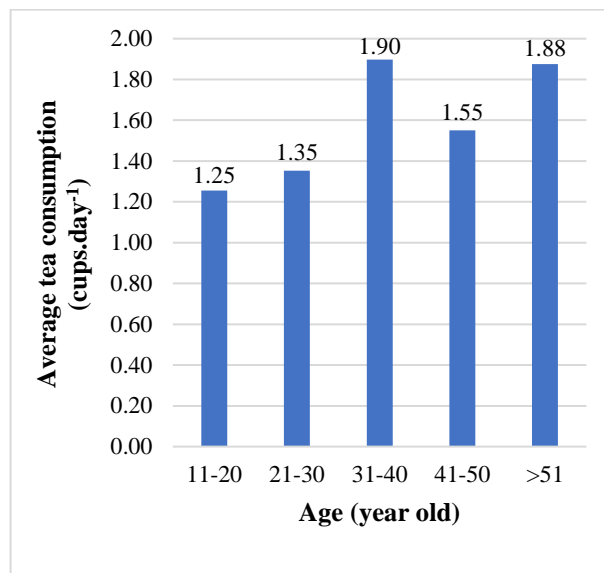


Figure 2. The age spread of respondents based on the frequency of tea consumption per day

Drinking tea in the mature age provides many benefits for health, including preventing cancer (Pham *et al.*, 2014; Hakim *et al.*, 2000). Based on the results of the study, it is stated that the content of catechins in drinking tea could decrease the production of glucose and increase the sensitivity of insulin (Stote and Baer, 2008). Green tea derived from *Camellia sinensis* leaves very rich in antioxidants and has an essential role in atherogenesis (Coimbra *et al.*, 2006). Consumption of green tea is inversely proportional to the risk of all causes of death in adults, especially for those who have never smoked (Zhao *et al.*, 2017).

According to some experts tea leaves contain some chemical substances which can be classified into seven (Potter, 1978). The seven groups are inorganic ingredients (Al, Mn, P, Ca, Mg, Fe, Se, Cu and K), nitrogen bonds (proteins, amino acids, alkaloids and caffeine), carbohydrates (sugar, starch and pectin), polyphenols and their derivatives (gallic acids, catechins, tannins, theaflavin and thearubigins), pigments (chlorophyll, anthocyanins and flavons), enzymes (polyphenols oxidase, peroxidase and pectase) and vitamins (vitamin C, vitamin E). Out of these seven groups are three essential components that can affect the quality of beverages, namely caffeine that causes a stimulant effect, tannins and their derivatives that make up the color, strength of the taste (power), the sense of the

astringency, and the potassium (K) essential effect on flavor and aroma (Potter, 1978).

Tea has some functional compounds attributed as healthy drink, such as catechins and caffeine. The highest caffeine content is found in green tea when compared to black tea (Table 3) (Fernández *et al.*, 2000). Caffeine in tea can reduce a person's fatigue, improve confidence, motivation, alertness, efficiency, concentration and cognitive performance of a person (Liu *et al.*, 2011).

Table 3. The content in tea (Fernández *et al.*, 2000)

The type of tea	Caffeine content mg in per g	Total amount of catechins mg per g
Black tea	33.8 – 38.9	12.1 – 42.1
Green tea	20.7 – 39.5	49.9 – 100.9

Next, we ask the correspondent on their preferred location to enjoy their tea. Understanding the consumer's preferred area may help the tea producers to map where they should distribute their tea products. Figure 3 shows that the respondent consumes the most tea at home. Consumption tea

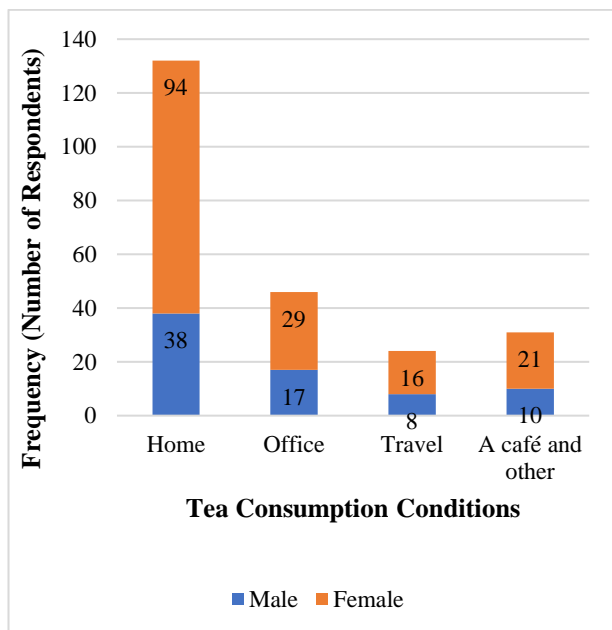


Figure 3. The spread of respondents based on tea consumption conditions

is due to the condition of the house is one of the most relaxing terms. Drinking tea tastes delicious when consumed during relaxing requirements because it can provide freshness to the body. For most respondents choose to drink tea because the aroma of tea while still warm feels very distinctive and cause a relaxed sensation. Besides, some argue

that drinking tea during many tasks or work can reduce drowsiness. The consumption of tea for respondents aims to keep their bodies awake from drowsiness during certain conditions (Dewi *et al.*, 2009; Liu *et al.*, 2011).

Indonesian people tend to enjoy the tea, whose like to add sugar or not. It is related to energy content in a glass of tea. Each beverage has varied energy content and nutrient composition. People often only pay attention to the amount of energy intake and nutrients from food and ignores the amount of energy intake and nutrients from the drink. Sweet drinks are generally consumed in a short time and do not give the same feeling of satiety with solid food so that consumers tend not to reduce other food intakes to compensate for the extra calories gained from sweet drinks. Excess calorie intake contributes to excess weight and obesity. This happens because the calories from a soft drink can easily be converted into fat and stored in tissue. Based on Figure. 4, most respondents used sugar as a mixture of tea (60.11%). This was due to the habit of most Indonesian people who like mixing tea with sugar. Nonetheless, the habit of drinking tea in Indonesia by some of its community (28.72%) is sugarless tea. The growing understanding to be able to reduce the number of calories in the beverage, then about 8.51% of people use low calorie sugar.

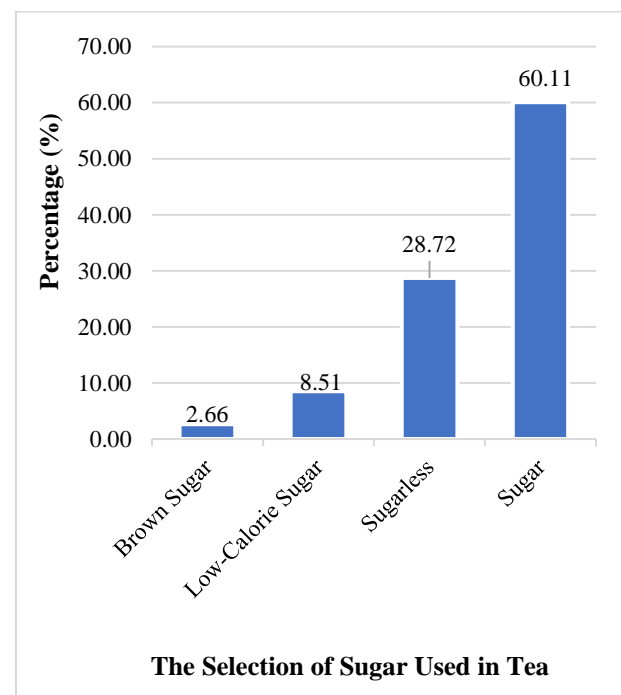


Figure 4. The spread of respondents based on the selection of sugar used in tea

In addition to sugar, there are other complements that added by respondents into tea,



such as creamer and milk. Figure. 5 shows that Indonesian people still love tea in their original condition (78.19%). The unique flavor of tea makes a particular sensation in consuming tea. As for the addition of milk in the most popular drink in Indonesian society. Consumers chose milk added tea 12.23%, while only 9.57% consumer was like to add creamer to the tea. The results of this research are in line with research that has been done by An and Shi (2016) that about 33.4% of consumers of adult tea in the US added milk to their tea beverages.

Each beverage has varied energy content and nutrient composition. The results of the analysis of calorie content in a cup of sweet tea (200 ml) is presented in Table 4. The results of this research shows the value of calories from tea drinks are still low from the ready tea. In general, the RTD tea (200 ml) has an amount of 90 calories.

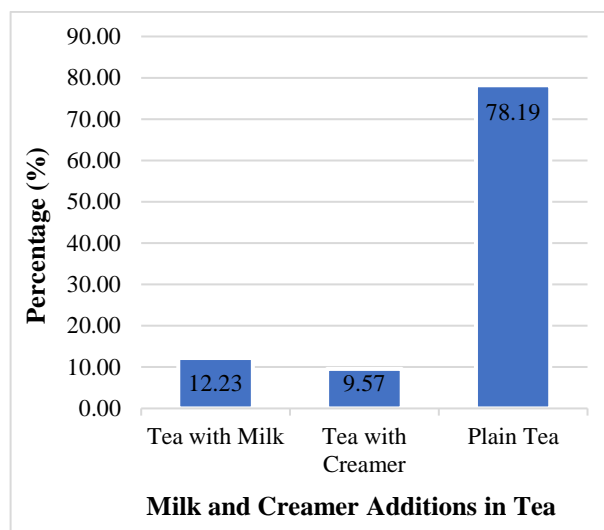


Figure 5. Distribution of respondents based on milk and creamer additions

Table 4. The composition on a cup of tea (200 ml)

Composition	Average (g)	Information
<b>Services 1</b>		
Tea (optional use tea bags or tea powder)	Tea bags: 1.85 ± 0.21 Tea powder : 22.5 ± 0.82	Caffeine ± 24-45 mg, Catechins ± 22-78 mg Caffeine ± 14-75 mg, Catechins ± 272-947 mg
Sugar	6 ± 0.71	16 Calories
<b>Total</b>		<b>16 Calories</b>
<b>Services 2</b>		
Tea (optional use tea bags or tea powder)	Tea bags: 1.85 ± 0.21 Tea powder : 22.5 ± 0.82	Caffeine ± 24-45 mg, Catechins ± 22-78 mg Caffeine ± 14-75 mg, Catechins ± 272-947 mg
Low-calorie sugar	2.5 ± 0.65	5 Calories
<b>Total</b>		<b>5 Calories</b>
<b>Services 3</b>		
Tea (optional use tea bags or tea powder)	Tea bags: 1.85 ± 0.21 Tea powder : 22.5 ± 0.82	Caffeine ± 24-45 mg, Catechins ± 22-78 mg Caffeine ± 14-75 mg, Catechins ± 272-947 mg
Sugar	6 ± 0.71	16 Calories
Creamer	3 ± 0.47	8.25 Calories
<b>Total</b>		<b>26.25 Calories</b>
<b>Services 4</b>		
Tea (optional use tea bags or tea powder)	Tea bags: 1.85 ± 0.21 Tea powder : 22.5 ± 0.82	Caffeine ± 24-45 mg, Catechins ± 22-78 mg Caffeine ± 14-75 mg, Catechins ± 272-947 mg
Sugar	6 ± 0.71	16 Calories
Powdered milk	30 ± 0.87	15 Calories
<b>Total</b>		<b>31 Calories</b>
<b>Service 5</b>		
Tea (optional use tea bags or tea powder)	Tea bags: 1.85 ± 0.21 Tea powder : 22.5 ± 0.82	Caffeine ± 24-45 mg, Catechins ± 22-78 mg Caffeine ± 14-75 mg, Catechins ± 272-947 mg
Brown sugar	4 ± 0.46	11 Calories
<b>Total</b>		<b>11 Calories</b>

The use of sugar in the tea mixture by consumers in Indonesia is still recorded lower than

consumers in the United States (US). Tea consumers in the US who consumed with extra calories, their

daily calorie intake grew. The calorie intake of sugar, total fat, and saturated fats derived from the tea beverages themselves are 27.7 calories, 20.3 calories, 0.04 calories, and 0.13 calories respectively (An and Shi, 2017).

The pattern of Indonesian society in making tea showed that most people prefer to use a dispenser or electric kettle (45.74%), and the second-order of the community still uses gas stove (42.55%) (Figure 6). Some of the respondents assumed that they need something practical in terms of tea brewing and not have a long time to able enjoying a warm cup of tea. In addition to the use of a dispenser or electric kettle and gas stove for brewing tea gives other benefits, which can control air pollution in the room. This is important because most tea consumers spend their time in the room, so the air quality indoors from a health perspective is an important issue to be looked out (Grimsrud, 1991). The use of gas stove also has benefits which is preserving environmental sustainability. The fuel input for cooking when using gas stove is 2.04 GJ/capita/year equivalent to 43.68 kg of LPG/capita/year. The fuel input value of gas stove is lower compared to kerosene which reaches 3.40 GJ/capita/year equivalent to 97.63 liters of kerosene/capita/year. Therefore, the gas stove for cooking can be said to be more energy efficient around 1.36 GJ/capita/year than kerosene stove (Endang, 2010).

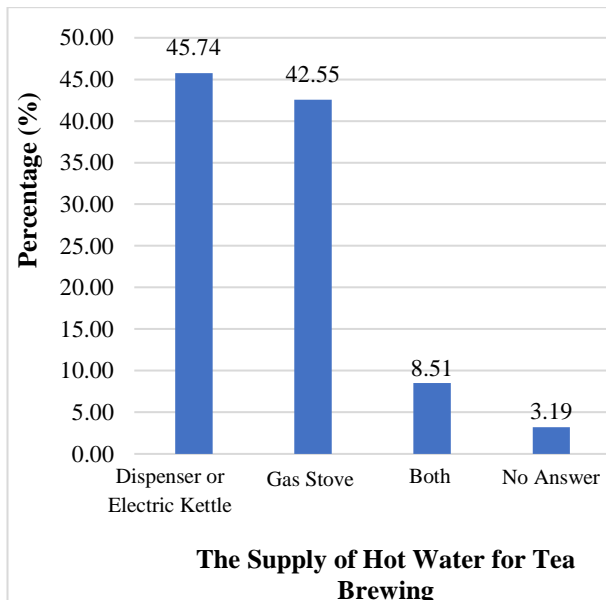


Figure 6. The spread of respondents based on the supply of hot water for tea brewing

There are two end of life alternatives for tea leaves residue of tea products, which are thrown as garbage or used in composting. Figure 7 shows that Indonesian people have been sorting waste from the

results of the tea making activity (59.04%). This is supported by the fact that many consumers drink tea bags (Figure 1) which the tea leaves residue can be processed into compost. The compost produced from the tea pulp can fertilize the soil and suppress disease in plants (Martin, 2014; Morales-corts *et al.*, 2018). This process can provide added value to the product, green consumption patterns and support the life cycle perspective.

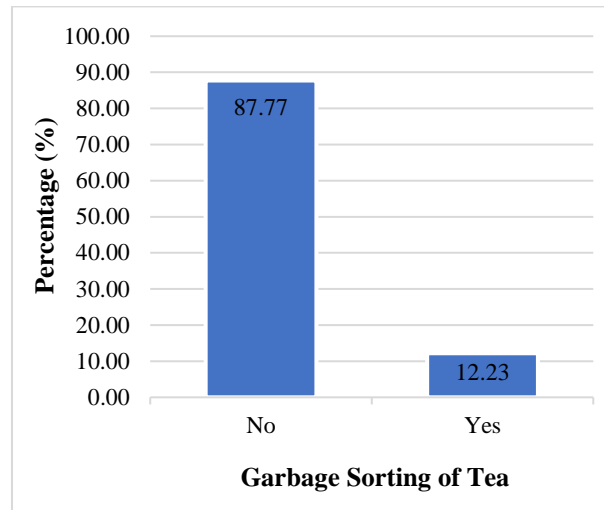


Figure 7. Distribution of respondents based on garbage sorting of tea making activities

### Relationship between age, gender and occupation of the selection of tea

Multinomial logistic regression is used to predict a nominal dependent variable given one or more independent variables. It is sometimes considered an extension of binomial logistic regression to allow for a dependent variable with more than two categories. As with other types of regression, multinomial logistic regression can have nominal and/or continuous independent variables and can have interactions between independent variables to predict the dependent variable. The results of the influence between age, gender, and occupation of the tea type selection are presented in Table 5 as follows.

Table 5. Model fitting information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	138.164			
Final	111.494	26.670	20	.145

*df* = degrees of freedom  
*Sig* = significant



The results of the Model Fitting Information table shows the simultaneous impact between age, gender, and occupation of the selection of tea types. These results can be seen in the column Likelihood Ratio Test, which obtained significance value of 0.145 ( $p > 0.05$ ), thus, no simultaneous influence (together) between age, gender and occupation toward the selection of tea types. This can mean that the age, gender and occupation factors are not a significant factor in the collection of tea types.

The results of the goodness of fit analysis (Table 6) indicate the proper logistics regression age, sex, and occupation of the selection of tea types. These results can be seen at Pearson's significance value of 0.682 ( $p > 0.05$ ) so that the regression results or models formed are worthy of use.

Table 6. Goodness of fit

	Chi-Square	Df	Sig.
Pearson	37.194	42	.682
Deviance	43.023	42	.427

*df* = Degrees of Freedom  
*Sig* = significant

The R-Square pseudo-results show a large percentage of the influence between free variables on bound variables, i.e., for age, gender, and occupation of the selection of tea types (Table 7). These results can be seen from the value of Cox and Snell amounting to 0.132 which means that an enormous influence on the choice of tea types by the variable age, gender, and occupation is 13.2 per cent, while the significant impact on the selection of tea types Described by the other variable is 86.8 per cent.

Table 7. Pseudo R-square

Cox and Snell	.132
Nagelkerke	.155
McFadden	.074

The results of the likelihood ratio test (Table 8) indicate that there is no partial influence for age, gender, and occupation of the selection of tea. These results can be seen from the significance value of each free variable ( $p > 0.05$ ), which means that age, gender, and occupation do not have a partial effect (individually) of the selection of tea types.

Table 8. Likelihood ratio test

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Df	Sig.
Intercept	111.494a	.000	0	.
Age	120.867	9.373	8	.312
Gender	113.529	2.034	2	.362
Occupation	121.319	9.825	10	.456

*df* = Degrees of Freedom  
*Sig* = significant

### Application to support sustainable manufacturing of tea

Tea is a trend among consumers around the world. According to the report from the International Tea Committee, global tea consumption soared by 60% between 1993 and 2010, and this significant growth is estimated as more and more people become tea consumer. The economic and social interests of tea production are so vital. Nowadays, tea industry has grown in 35 countries in the world. The tea industry has a significant role in the provision of technical resources and export revenues, especially in developing countries.

At this time, the tea industry faced enormous challenges and needed cooperation from all areas for the sustainability of their industry. There are several factors that become a significant challenge and have significant implications as the tea industry: demographic change, resource constraints, climate change, land availability and productivity, labor availability, balance. Throughout the supply chain, emerging new business models, ongoing leadership in developing countries, increased wages and labor welfare, and consumer attitudes towards food value (International Tea Committee, 2019).

Based on the results of the research it is known that variable age, gender and occupation have no significant effect on the selection of the type of tea taken. This brings out a big scenario to make the tea industry can survive. This scenario is also expected to illustrate a deeper understanding of tea consumption in the coming year. The main thing to include in the situation is how the tea industry's ability attract investment and collaborate with business and government sectors (International Tea Committee, 2019).

With the growth of high generation millennials in Indonesia, it makes an excellent opportunity to able create innovative product and

start glancing at the prospect. According to approve data, the consumer tends to drink tea with sugar and without milk or creamer. Therefore, sustainable manufacturing can be achieved through new product development by considering sugar and without milk. For instance, tea with fruit flavor or possibly effervescent tea. These products should be accompanied by environmental information such as carbon footprint labels containing GWP (International Tea Committee, 2019).

To support the sustainability of tea industry, consumers behavior is also very important to be studied because they usually ask for high production standards but at a cheap cost. According to an interview, they are still confused about how to appreciate the tea products they use. This is because the tea products in Indonesia have not yet included ecolabel about how many emissions they will use when handling specific products. Of course, this is a challenge for the activists of the tea industry in Indonesia to come forward quickly, so they able to list the Ecolabel of the product they produce (Bardant *et al.*, 2018a; Bardant *et al.*, 2018b; Setiawan *et al.*, 2019).

#### 4. CONCLUSION

The perspective of life cycle consumption patterns of consumer tea on a tea product is crucial to know the behavior of society. Based on the results of the research is known that variable age, gender, and occupation have no significant effect on the selection of the type of tea taken. This brings out the big scenario to make the tea industry can survive. To support the sustainable tea industry consumer behavior is also very important to be studied because consumers usually ask for high production standards but at a cheap cost.

The majority of tea consumer in Indonesia is in a group age of 31-40. Meanwhile, based on consumer behavior, Indonesia tea consumer prefers to consume the tea bag product by preparing it in boiled water. The preferred method for boiling water is both by using electric kettle and gas stove. Furthermore, tea is mostly prepared without any addition of creamer or milk. The habit of sorting waste and turning into compost, it can provide added value to the product. Based on all the behavior of Indonesians in favor of green consumption patterns and support the life cycle perspective. Seeing the tendency of Indonesians who like sweet tea drinks, it is necessary to develop research into the diversification of tea products.

#### 5. ACKNOWLEDGMENTS

This research is part of the activities INSINAS “Life cycle assessment and Analysis of Green Supply Chain in the Processed Products of Tea for the Model Development Downstream Sustainable” funded by the Ministry of Research and Technology of the Year 2019.

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