



Analysis of Consumer Buying Interest in The Application of Intelligent Packaging of Wet Cakes at Palembang City to Support Palembang Tourism

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ABSTRACT

Conventional packaging used in wet cakes has not optimally provided protection, thus impacting the safety of wet cakes and consumer convenience. Several studies on intelligent packaging formulations have been conducted, but not much has been done on consumer buying interest in the use of intelligent packaging. Meanwhile, buying interest is a challenge for producers in implementing new technology. The objective of this research is to identify factors that influence the purchase intention of wet cakes and analyze the preference for the use of intelligent packaging in packaging. This research uses a quantitative approach with an incidental sampling method with the criteria of potentially buying wet cakes. Data were analyzed using regression to answer the influence factors, and chi square to analyze preferences. The results show that of the five variables, packaging and brand do not have an influence on consumer buying interest, namely sig values. 0.847 and 1.000 > 0.05. However, the use of intelligent technology in packaging (design, structure and information) has a significant influence on the tendency of consumers to buy wet cakes with sig values. 0.000, 0.001 and 0.000. These results can recommend to entrepreneurs to be able to use technology on their packaging.

Key words: Consumer buying, Intelligent packaging, Wet cake

1. INTRODUCTION

Wet cake is one of the traditional cakes categorized based on its moisture content. Based on SNI 01-4309-1996, wet cakes have a maximum moisture content of 40%. Wet cakes have soft and semi-moist characteristics (Artopo & Wahyuni, 2024). Generally it was made by steaming and baking (Fizriani et al., 2019). Some of wet cakes include Lapis, Eight hours, Maksubah, Srikaya, Kojo, brownis, wajik, enggak ketan and others (Karmela & Isnawati, 2019). In Palembang, this wet cake used to be made only on holidays and weddings (Oktaria et al., 2022). But with the times and the needs of consumers, wet cakes have become available around the clock and have become souvenirs. The cakes can be ordered easily through social media or can be bought at cake shops (Yaqin et al., 2023). The price ranges from 400 to 1 million rupiah per pan. However, the problem is that apart from being expensive, wet cakes are easily damaged (Wardana & Setiarto, 2024) and only conventionally packaged using plastic (Yani, Idealistuti, & Komala, 2021). The conventional packaging used has not been able to provide optimal protection, which will impact the safety of wet cakes and consumer convenience (Prasath, et al., 2025).

Monitoring the safety of packaged wet cakes can be done using intelligent packaging (Palanisamy et al., 2024). Intelligent packaging is packaging with new technology that applies Artificial Intelligent (AI) in packaging. Intelligent packaging utilizes the communication function on the packaging and works using sensors embedded in the packaging.(Waqas et al., 2025). The sensor component will react if there is a change in temperature, humidity, pH or microbial growth in the package (Fallah et al., 2025);(Waldhans et al., 2025) so that producers and consumers get information about the condition of packaged products in real time (Klaric et al., 2025). In addition to providing product condition information, intelligent packaging also has a role in marketing, namely making packaging more attractive, informative and innovative. Some research on intelligent packaging that has been carried out includes the formulation of sensors to monitor the freshness of shrimp (Chen et al., 2025); (Liu et al., 2025), meat (Wang et al., 2025); (Shahbazi & Shavisi, 2025), fish (Hao et al., 2025); (Cheng et al., 2025), and fruits (Jia et al., 2025); (M & Voala, 2025).

There has not been much research on consumer buying interest in the use of intelligent packaging, while buying interest is a challenge for a manufacturer if new technology is applied (Wahab et al., 2024). (Fernández et al., 2022) said that the use of intelligent packaging in packaging has several advantages including informing product quality in real time, ensuring product authenticity, and helping producers to facilitate distribution tracking. Therefore, research on consumer buying interest is important to analyze how consumers respond to the use of intelligent packaging on packaging, especially on wet cakes. The objective of this research is to identify factors that influence consumer buying interest in wet cakes, and analyze consumer preferences for the use of intelligent in packaging.

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2. METHODS

Population and Sampling

The population used was the people of Palembang city. Sampling using non probably sampling with incidental sampling method. Incidental sampling is a sampling technique by means of anyone who happens to meet the researcher can be used as a sample, but has appropriate criteria as a data source (Marlius & Putriani, 2020). The population criteria used in this study are those who have the potential to buy wet cakes. The number of samples used in this study were 150 respondents. This is in accordance with the statemen (Sekaran & Bougie, 2006) which expresses size. If the population is very large, then the sample size ranges from 30 - 500 respondents. The larger the sample, the smaller the chance of error and the larger the sample, the greater the chance of error. In the first and second stages, data was collected through questionnaires.

Type and Source of Data

The type of data used is quantitative data sourced from primary data (Taan, 2021). Primary data is in the form of a percentage of factors that influence consumer interest and a Likert scale for consumer preferences for the use of intelligent packaging on packaging. The Likert scale used for scoring the questionnaire is strongly agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1). The questions were submitted to respondents via gform.

Research Design

This study uses a quantitative research approach. Quantitative research is a research method based on the philosophy of positivism, used to examine certain populations or samples (Sugiyono, 2002). (Muhajirin et al., 2024) added that quantitative research uses numerical data and analytical techniques to test hypotheses, draw conclusions and understand the relationship between variables. This research was conducted in two stages. The first stage identifies the factors that influence consumer buying interest in wet cakes associated with Kotler's variables in (Maharani & Musnaini, 2024) namely price (Price) (X1), brand (Promotion) (X2), packaging design (Promotion) (X3), cake content/composition (Product) (X4), friends/family recommendations (Place) (X5) to consumer interest (Y). The second stage is to analyze consumer preferences, where the perception of wet cakes becomes variable (X) and purchase intention becomes variable (Y). Variable (X) includes three dimensions of packaging including design, structure and information (Hadi et al., 2021).

Data Analysis

In the first stage of the research, data was analyzed using regression to see the relationship and influence of variables (Husni, A dan Randi, 2024) interest factors with consumer purchase intention. In the second stage, the data was analyzed using chi square. This technique is in line with research (Monintja et al., 2024). The chi square test is used to test the effect of two nominal variables and measure the strength between design, structure and information variables (C = Coefisien of contingency). The data obtained was analyzed through SPSS, starting to test the validity, reliability and chi square test (Amaria et al., 2024).

3. RESULTS AND DISCUSSIONS

Results

Regression of factors that influence consumer buying interest in wet cakes

Based on the survey results on price (Price), brand (Promotion), packaging design (Promotion), cake content/composition (Product), recommendations from friends/family (Place), the data obtained (Figure 1).

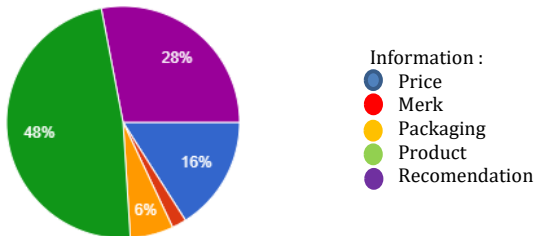


Figure 1. Percentage of consumer purchase intention factors
Source: Primary data (2025)

Cake content/composition (product) has the highest percentage of 48% in the factors considered when consumers buy wet cakes, followed by the recommendation factor of friends/family (place). Regression shows (Table 1) that the variables of content/composition, recommendation, and price are factors that influence consumer buying interest in wet cakes. This is indicated by the Sig. value of the content/composition, recommendation and price variables is <0.05.

Table 1. Multiple linear regression test results

Variable (factors)	R ²	Sig.
Content/composition (product)	0.954	0.040*
Recommendation (place)	0.916	0.011*
Packaging (promotion)	0.014	0.847
Price (price)	0.852	0.025*
Brand (promotion)	0.000	1.000

Source: Processed data (2025).

Quality instrument test (validity of intelligent packaging applicatio value)

The results of the validity test of the variable assessment (Table 2). with an r-table value of 0.275 (0.05,48) indicate that all variables are declared valid.

Table 2. The results of the validity test of IP application to design, information, structure and preference

	Variabel	Pearson correlation	Sig. (2-tailed)	Information
Design	Information	0.292	0.040	valid
	Structure	0.607	0.000	valid
	Preference	0.659	0.000	valid
Information	Design	0.292	0.040	valid
	Structure	0.384	0.006	valid
	Preference	0.675	0.000	valid
Structure	Design	0.607	0.000	valid
	Information	0.384	0.006	valid
	Preference	0.511	0.000	valid
Preference	Design	0.977	0.000	valid
	Information	0.314	0.033	valid
	Structure	0.638	0.000	valid

Source: Processed data (2025).

The results of the reliability test on variables, have a Cronbach's Alpha value of 0.805 and N of Items 4 which states that the data obtained has high consistency if the test is repeated.

Uji Chi Square

Expected count is the main requirement before conducting chi square testing. Expected count must be more than 5 in 80% of cells, otherwise the Chi-square test is invalid.

Design*Preference

Table 3. Expected count design vs preference

Design		Preference				Total
		2.00	3.00	4.00	5.00	
1.00	Count	1	0	0	0	1
	Expected Count	.1	.2	.5	.2	1.0
2.00	Count	2	1	1	0	4
	Expected Count	.2	.9	2.0	.9	4.0
3.00	Count	0	7	7	0	14
	Expected Count	.8	3.1	7.0	3.1	14.0
4.00	Count	0	1	6	2	9
	Expected Count	.5	2.0	4.5	2.0	9.0
5.00	Count	0	2	11	9	22
	Expected Count	1.3	4.8	11.0	4.8	22.0
Total	Count	3	11	25	11	50
	Expected Count	3.0	11.0	25.0	11.0	50.0

Source: Processed data (2025).

The Chi square test (Table 5) shows that the coefficient value (Pearson Chi-square) is 46.96 with an expected count of 90% (valid) cells having a value of more than 5. The asymptotic significance test result of design*preference was $0.000 < 0.05$, it showed that there was a significant relationship between design and preference.

Table 4. Chi-Square Tests design * preference

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	46.966 ^a	12	.000
Likelihood Ratio	34.228	12	.001
Linear-by-Linear Association	21.268	1	.000
N of Valid Cases	50		

a. 18 cells (90.0%) have expected count less than 5. The minimum expected count is .06.

Source: Processed data (2025)

Information*Preference

Table 5. Expected count information vs preference

		Preferensi				Total	
		2.00	3.00	4.00	5.00		
Information	2.00	Count	1	2	0	3	
		Expected Count	.2	.7	1.5	.7	3.0
	3.00	Count	2	4	5	0	11
		Expected Count	.7	2.4	5.5	2.4	11.0
	4.00	Count	0	5	14	3	22
		Expected Count	1.3	4.8	11.0	4.8	22.0
	5.00	Count	0	0	6	8	14
		Expected Count	.8	3.1	7.0	3.1	14.0
Total		Count	3	11	25	11	50
		Expected Count	3.0	11.0	25.0	11.0	50.0

Source: Processed data (2025)

The Chi square test (Table 7) shows that the coefficient value (Pearson Chi-square) is 29.599 with an expected count of 81.3% (valid) cells having a value greater than 5. The asymptotic significance test result of design*preference was $0.000 < 0.05$, it showed that there is a significant relationship between design and preference.

Table 6. Chi-Square Tests information * preference

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.599 ^a	9	.001
Likelihood Ratio	32.996	9	.000
Linear-by-Linear Association	22.347	1	.000
N of Valid Cases	50		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .18.

Source: Processed data (2025)

Structure*Preference

Table 7. Expected count structure vs preference

		Preferensi				Total	
		2.00	3.00	4.00	5.00		
Structure	2.00	Count	2	0	0	0	2
		Expected Count	.1	.4	1.0	.4	2.0
	3.00	Count	1	2	4	0	7
		Expected Count	.4	1.5	3.5	1.5	7.0
	4.00	Count	0	5	12	3	20
		Expected Count	1.2	4.4	10.0	4.4	20.0

5.00	Count	0	4	9	8	21
	Expected Count	1.3	4.6	10.5	4.6	21.0
Total	Count	3	11	25	11	50
	Expected Count	3.0	11.0	25.0	11.0	50.0

Source: Processed data (2025)

The Chi square test (Table 9) shows that the coefficient value (Pearson Chi-square) is 40.041 with an expected count of 87.5% (valid) cells having a value of more than 5. The asymptotic significance test result of design*preference was 0.000<0.05, it showed that there is a significant relationship between design and preference.

Tabel 8. Chi-Square Tests structure * preference

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	40.041 ^a	9	.000
Likelihood Ratio	23.316	9	.006
Linear-by-Linear Association	12.811	1	.000
N of Valid Cases	50		

a. 14 cells (87.5%) have expected count less than 5. The minimum expected count is .12.

Source: Processed data (2025)

Discussion

Identification of factors that influence consumer buying interest in wet cakes

Consumer interest which is influenced by content / composition, recommendations and price is caused by consumer characteristics. (Berlilana et al., 2024) said that consumer characteristics are influenced by several factors, namely social, cultural, psychological and personal. Respondents used in this study are the people of South Sumatra, with characteristics of 80% aged 18-27 years, 64% are female and 78% of their jobs are students who come from various regions in South Sumatra. (Cahya, 2024) said that culture is the most important determinant of desires and behavior. A person has values, perceptions, references and behavior through family and environment. The tendency of consumer interest in the content/composition, price and recommendation of wet cakes is because Palembang people prefer low prices but quality. This is shown from the results of research (Sabatiny & Martini, 2018) that Palembang people like to bargain prices in a familiar atmosphere when conducting economic transactions. The familiarity built during transactions creates social value in the form of trust so that one another trusts the reference product more.

Another reason for the Palembang people's tendency towards the content/composition of wet cakes is because Palembang people are accustomed to consuming wet cakes in good taste and attractive appearance. (Oktaria et al., 2022) revealed that wet cakes were once served as food for the noble class or for honored guests. This history brings the habits of the Palembang people until now.

Consumer preferences for the use of intelligent packaging in design

Based on the Chi square test results, it is obtained that the use of intelligent packaging technology on the packaging dimensions, namely design, structure and information, has a significant influence on consumer preferences. This is indicated by the significance value of each dimension or variable <0.05 with a P-Value (coefficient value) of 46.966, 29.599 and 40.041 respectively. This is due to the use of technology that opens consumer confidence that producers provide security guarantees and care for consumers (Ros-Lis & Benitez Serra, 2023). In addition, the significance is also due to the consumers who became respondents aged 18-27 years as much as 80% (Figure 2).

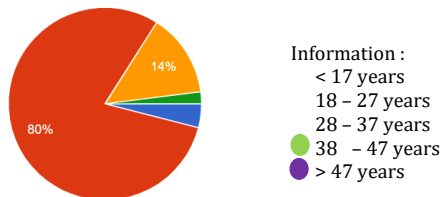


Figure 2. percentage of consumer age

Source: Primary data (2025)

This age is generation Z who was born in 1997-2012. Generation Z is the first generation to grow up in the digital era, they make technology and digital a part of everyday life. Such characteristics can affect future business strategies (Wibowo & Ayuningtyas, 2024).

The use of technology in the generation Z era provides its own stimuli. (Johar et al., 2015) said that several stages of stimulation that consumers go through to buy a product are attention, interest, desire and action. First, potential consumers first pay attention to products that are being promoted or that are different from others. Furthermore, potential consumers will be interested and have a desire to own the product being offered. After the prospective consumer has a desire, the prospective consumer will buy it.

Intelligent packaging has a different design, function and usability from general packaging. Packaging can experience color changes and functions not only as a container but also communicates to consumers in realtime (Drago et al., 2020). The different characteristics of intelligent packaging can attract attention because intelligent packaging can contribute to the color and shape of the packaging. The application of intelligent packaging in packaging design can contribute to attractive colors. For example, in fruit packaging design (Figure 3a) stated by (Priyadarshi et al., 2021) and freshness of fish (Figure 3b)(Ciravegna, 2023).



Source: (Priyadarshi et al., 2021)

Figure 3. Fresh intelligent packaging design tags (a) fruit and (b) fish

Intelligent packaging (IP) can provide bright colors so that consumers are interested in buying it. Light or bright colors will reflect light further than dark colors. In addition, bright colors will increase appetite (Dika et al., 2023). For Palembang wet cake, intelligent packaging design can be applied to conventional cake packaging. Intelligent packaging design can be applied to packaging labels. The application of intelligent packaging to the packaging structure can contribute to the material, size and shape of the packaging (Darmawati, 2020). For example, mugs may change when inside are hot (Figure 4).



Figure 4. Mug change when inside are hot

Source : (Indiamart, 2025)

The mug material be hot and change color of mug. In the other sample are at vacuum packaging, the packaging changes color and bulges if the packaged product has been damaged. For this type of research, it has never been done. The application of intelligent packaging in the form of product information has been widely carried out, namely on TTIs (Time Temperature Indicators) (Gao et al., 2020), product freshness (Kim et al., 2023), product contamination and more (Pratama et al., 2016). Packaging provides information through color changes in case of temperature changes, spoilage and contamination. In wet cakes, intelligent packaging applications can also be used to see the freshness of wet cakes during storage by using sensors, labels or barcode systems.

4. CONCLUSION

Based on the research results previously described, it appears that of the five 4P factors (Product, Price, Promotion and Place), packaging and brand are not factors that influence consumer buying interest in wet cakes in Palembang city. However, if this packaging is developed by applying intelligent technology in it, then the packaging can attract the tendency of potential consumers to buy wet cakes. For wet cake entrepreneurs in Palembang city, the use of intelligent technology in packaging should be done, so that in addition to providing comfort and trust. The packaging used can also be a distinctive feature that distinguishes one producer from another. For further research, it is recommended to use intelligent technology in the packaging structure, because this research is still little done.

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