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**ANALYTICAL HIERARCHY PROCESS (AHP) APPROACH ON CONSUMER BUYING BEHAVIOR IN SELECTING CIGARETTES****PENDEKTAN ANALISIS HIRARKI PROSES ATAS PERILAKU PEMBELI DALAM MEMILIH ROKOK**

by:

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**Abstract:** A cigarette is a small cylinder of finely cut tobacco leaves rolled thin in paper for smoking. Rates of cigarettes smoking very widely throughout the world and have changed considerably since cigarettes were first widely used in the mid-19 century. It keep growing the demand of cigarettes, even young people mostly like to show off using cigarettes. Regarding the circumstance above, through this research will analyze that three cigarettes in Manado (Gudang Garam (Surya), Marlboro, and Sampoerna) with the criteria that can influence consumer preferences to select a cigarette, and try to find which cigarette to meet the customers' satisfaction the most and which criteria has influence the most people in selecting a cigarette. The result using Analytical Hierarchy Process (AHP) shows that Gudang Garam is the most preferred cigarette brand for all among the alternatives, from the seven criteria, Price and Quality is the most concerned criteria. If the price is not match with the price that consumer want, consumer will still choose the most affordable one, in this case is Gudang Garam. The two other companies may have to recheck the price that the companies have been put in the product.

**Keywords:** Consumer Buying Behavior, Analytical Hierarchy Process

**Abstrak:** Rokok adalah silinder kecil daun tembakau yang dipotong tipis digulung tipis di atas kertas untuk merokok. Tarif rokok yang merokok sangat luas di seluruh dunia dan telah berubah jauh sejak rokok pertama kali banyak digunakan pada pertengahan abad ke-19. Ini terus menumbuhkan permintaan rokok, bahkan kaum muda kebanyakan suka pamer menggunakan rokok. Mengenai keadaan di atas, melalui penelitian ini akan dianalisis bahwa tiga batang rokok di Manado (Gudang Garam (Surya), Marlboro, dan Sampoerna) dengan kriteria yang dapat mempengaruhi preferensi konsumen untuk memilih rokok, dan mencoba untuk menemukan rokok mana yang sesuai dengan kebutuhan konsumen. 'Kepuasan paling banyak dan kriteria mana yang mempengaruhi kebanyakan orang dalam memilih sebatang rokok. Hasilnya menggunakan Analytical Hierarchy Process (AHP) menunjukkan bahwa Gudang Garam adalah merek rokok yang paling disukai untuk semua alternatif, dari tujuh kriteria (harga, kualitas, iklan, variasi produk, merek, kemasan, dan ketersediaan), dua teratas Kriteria yang sangat berpengaruh bagi konsumen untuk memilih rokok adalah Price and Quality. Jika harganya tidak sesuai dengan harga yang diinginkan konsumen, konsumen tetap akan memilih yang paling terjangkau, dalam hal ini adalah Gudang Garam. Kedua perusahaan lain mungkin harus mengecek ulang harga yang telah dimasukkan perusahaan ke dalam produk.

**Kata kunci:** perilaku pembelian konsumen, analisis hirarki proses

## INTRODUCTION

### Research Background

A cigarette is a small cylinder of finely cut tobacco leaves rolled thin in paper for smoking. The term cigarette as commonly used, refers to a tobacco cigarette, but can apply to similar device containing other substance such as cloves or cannabis. Rates of cigarettes smoking very widely throughout the world and have changed considerably since cigarettes were first widely used in the mid-19 century. While rates of smoking have over leveled off or declined in the developed world, they continue to rise in developing nations.

People smoke because it is a part of habit to fulfill their satisfaction or just to show off. Cigarette is now become a need with a large production. It keep growing the demand of cigarettes, even young people mostly like to show off using cigarettes. Consumer now become more selective and have many consideration to in the decision making to select a cigarettes. Many factors that influence the decision making of consumer like advertisement, Quality of the product, circle, habit and many more.

Smoking can be the reason of satisfaction for several people. Satisfaction is what human need. That is what people in Indonesia facing for now it makes the cigarettes industry in Indonesia keep on growing their production and promotion of cigarettes. Not as a problem, but a need that have to be fulfill each day, that is what has happen in Indonesia.

Cigarette in Manado has become a commodity that, have been used every day by some people. It becomes a need to be fulfilled. Means, the market of cigarette in Manado is growing rapidly. There are so many different types of cigarettes here in Manado. The Big 3 of the most popular cigarettes in Manado are, Gudang Garam (Surya), Marlboro, and Sampoerna.

Those three products above have their own strategies in attracting the consumer. Such as the different type of taste, captivating advertisement, masculine packaging and many other. There is so many options to choose what is the best cigarettes depend on the criteria that influence the consumer needs, purchasing power and also Consumer Purchase Decision to every each of Brand Products.

Regarding the circumstance above, through this research will analyze that three cigarettes brands in Manado (Gudang Garam (Surya), Marlboro, and Sampoerna) with the criteria that can influence consumer preferences to select a cigarette, and try to find which cigarette to meet the customers' satisfaction the most and which criteria has influence the most people in selecting a cigarette. Based on background above, the aim of this research is to "Analytical Hierarchy Process (AHP) approach on Consumer Buying Behavior in Selecting Cigarette (Case Study: Gudang Garam (Surya), Marlboro, and Sampoerna)".

### Research Objective

1. To identify which cigarettes is the most favorable for people.
2. To identify which criteria is the most important for costumer in selecting cigarettes.

## THEORETICAL FRAMEWORK

### Marketing

According to Kotler and Amrstrong (2012) goal of marketing is to attract new customer by promising superior value and to keep and grow current customers by delivering satisfaction. Marketing involves more than just activities performed a group of people in a defined area of department. Marketing involves more than just activities performed a group of people in a defined area of department. Marketing entails processes that focus on delivering value and benefits to customer, not just selling goods, service, and/or ideas. It uses communication, distribution, and pricing strategies to provide customers and other stakeholders with the goods, services, ideas, values, and benefits they desire when and where they want them. It involves building long-term, mutually rewarding relationships when these benefits all parties concerned. McDaniel, et al, (2011) Stated, Marketing also entails an understanding that organizations have many connected stakeholder "partners," including employees, suppliers, stockholders, distributors, and society at large.

**Consumer Behavior**

Kuester, Sabine (2012) stated, consumer behaviour is the study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products, services, experiences, or ideas to satisfy needs and the impacts that these processes have on the consumer and society. McDaniel, Lamb and Hair (2011), Customer decision making is an important thing because in understanding customer decision making, we will know how customer/consumer make the purchase decision, how the process of decision making by customer from searching until selecting the product or service, and also we can know the factors that influence the decision making. It can be conclude that customer decision making the step of making a decision in purchasing a product.

**Price**

According macdonald and sharp (2000) price is the amount of money of costumer pays for an item. A costumer uses price to indicate the quality of benefits of a brand. This means that price plays a role in purchasing a brand because a costumer can choose a low price to prevent financial risk or choose a high price to achieve product quality.

**Quality**

Shaharudin et al., (2010) stated product quality is the most important factor for the selection of each motorcycle brand/model especially in a market environment where the level of competition is intense and price-competitive. However, it is difficult to meet the customers' expectation on quality since their understanding is varied and inconsistent.

**Advertisement**

Cannon, Perreault, McCarthy (2008) said Advertising as the impersonal presentation of ideas, goods, or services paid by a sponsor Advertising has a positive effect on sales. Celebrity endorsement influence consumer's buying behavior and helps in brand building. Studies have found that there are gender differences in terms of What, Where, When and How they buy but still there is need to study the impact of advertisement campaign of two wheelers on consumer buying behavior.

**Product Variety**

Ulrich and Randall (2001) defined product variety as the number of different versions of a product offered by a firm at a single point in time.

**Brand**

Kotler,Wong, Saunder and Strong (2005). Brand can be defined as "the distinctive product offering created by the use of a name, symbol, design, packaging, or some combination of these intended to differentiate it from its competitors". Another definition of brand is "a name.

**Packaging**

Develop the habit of standing back and looking at every visual element in the packaging of the product or service through the eyes of a critical prospect. Small improvements in the packaging or external appearance of the product or service can often lead to completely different reactions from the customers.

**Availability**

Lin and Chang (2003) Availability means the access to a product or brand in a store at the time of purchasing. The convenience of a product or brand has a great influence on the consumer buying behavior.

**Multi-Criteria Decision Making**

Most decision making involves complicated procedures in which decision makers rank the alternatives of a choice according to multiple criteria (Saaty, 2008).

**Previous Research**

Diane Von Ah, et al (2005) explain about, the cigarettes smoking behavior among college students. A total of 161 U.S college students, aged 18-26 the majority of the students had tried smoking (55%); among those who had tried, 42% were current smokers. The majority (77%) who had smoke whole cigarette did so at age 16

years or younger. Despite the clear evidence of the harmful effects of smoking, over half of the college students in this study reported that they had tried cigarettes. Jie-Min Lee, et al (2009) is explain about, the investigation of the factors that influence smoker decision to consume light cigarettes. Using data on 3,939 smokers drawn from survey complied in 2000 by the Bureau of health promotion, Department of Health, Executive Yuan in Taiwan. The study’s estimation result indicate that an increase in cigarettes price will reduce the cigarettes smoking rate.

Vera Boadu (2012) Price is seen to be an indicator for the quality of the brand when a costumers lack the enthusiasm to assess the quality of the brand. Costumers are ready to pay more just to receive the best cigarettes. Another factor that that had the highest score from all others factors is the availability of cigarette when making a purchase decision. Rupert Nelson, et al (2005) Variable which had the strongest associations with a student source of cigarettes were current smoking, parental smoking and socioeconomic status. This study shows the presence of a wide number of circumstantial and demographic factors which affects the cigarettes access behavior of youth smokers.

### RESEARCH METHOD

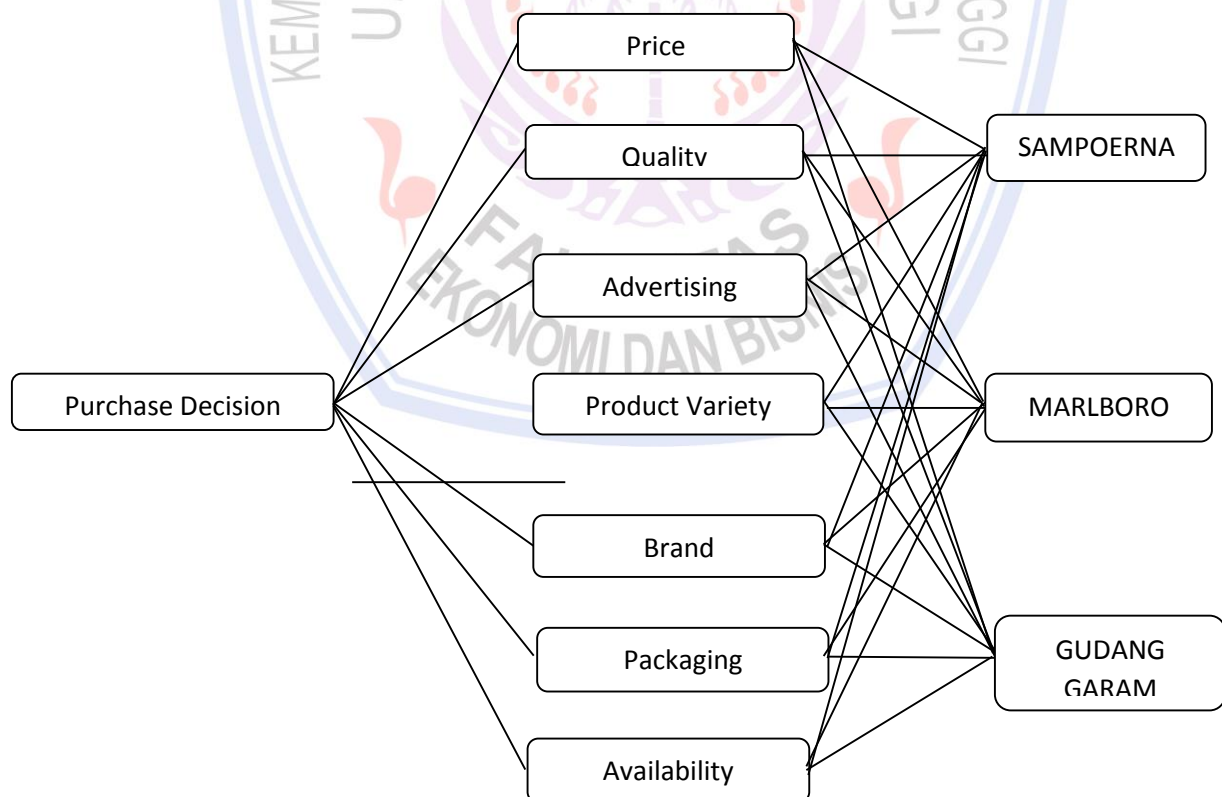
#### Type of Research

This research will use quantitative method. Quantitative research seeks to quantify the data. It seeks conclusive evidence based on large, representative samples and typically involving some form of statistical analysis (Maholtra, 2009)

#### Place and Time of Research

This research is conducted in Manado. These research use customer that have experienced using at that three brands and also the Potential customers as the respondent. This research will be held from June – July 2016.

#### Conceptual Framework



Source: Data Processed, 2016

### Population and Sample

The population in this research is consumer of cigarette. The sample of this research is all smokers and all potential smoker of Sampoerna, Mrlboro, and Gudang Garam as many as 100 respondents according to Sekaran and Bougie (2009) sample is a subset of the population that already had experience the three brand. The purposive sampling.

### Data Collection Method

The primary data used in this research is questionnaire that will be distributed to respondents in Manado. Secondary data in this research were used in the research background, literature review and research methodology.

### Operational Definition and Measurement of Research Variable.

Variables	Operational Definition
Consumer Behavior	Consumer behavior is defined as the behavior that consumers display in searching for purchasing, using, evaluating and disposing of cigarette brand that they expect will satisfy their needs
Price	Price is the amount of money of costumer pays for a cigarette. A costumer uses price to indicate the quality of benefits of a brand.
Quality	Consumer perceived on quality is the perception of the superiority or overall quality of a cigarette with respect to its intended purpose.
Advertising	Advertising means a marketing communication, which publicizes attribute of a cigarette to costumers.
Product Variety	Company offers the marketplace at a point in time, and generational variety means variety across future generations of cigarettes.
Brand	Brand is something that symbolizes the uniqueness of the cigarette, since it differs from other products from competitors even if it satisfies the same needs.
Packaging	Packaging or external appearance of the cigarette can often lead to completely different reactions from the customers.
Availability	A Customer does not have the time to move from one shop to the other when purchasing low involvement cigarette, the customer will choose a different brand cigarettes or switch the entire shop.

Alternatives: Gudang Garam, Sampoerna, and Marlboro.

### Data Analysis Method

The Analytic Hierarchy Process (AHP) is due to Saaty (2008) and is often referred to, eponymously, as the Saaty method. It allows users to assess the relative weight of multiple criteria or multiple options against given criteria in an intuitive manner. In case quantitative ratings are not available, policy makers or assessors can still recognize whether one the criteria is more important than another. Therefore, pair wise comparisons are appealing to users. Saaty established a consistent way of converting such pair wise comparisons (X is more important than Y) into a set of numbers representing the relative priority of each of the criteria.

**Table.1 Rating Scale**

Intensity of importance	Definition	Explanation
1	Equal importance	Two criterias contribute equally to the objective
3	Somewhat more important	Experience and judgement slightly favour one over the other.
5	Much more important	Experience and judgement strongly favour one over the other.

Intensity of importance	Definition	Explanation
7	Very much more important	Experience and judgement very strongly favour one over the other. Its importance is demonstrated in practice.
9	Absolutely more important.	The evidence favouring one over the other is of the highest possible validity.
2,4,6,8	Intermediate values	When compromise is needed

Source: Data Processed, 2016

Taylor (2013:445) mentioned a summary of the mathematical steps used to arrive at the AHP-recommended decision:

1. Develop a pairwise comparison matrix for each decision alternatives (site) for each criterion.
2. Synthesization:
  - a. Sum the value in each column of the pairwise comparison matrices.
  - b. Divided each value in each column of the pairwise comparison matrices by the correspondent column sum-these are the normalized matrices.
  - c. Average the values in each row of the normalized matrices-these are the preference vectors.
  - d. Combine he vectors of preferences for each criterion (from step 2c) into one preference matrix that shows the preference for each site for each criterion.
3. Develop a pairwise comparison matrix for the criteria.
4. Compute the normalized matrix by dividing each value in each column of the matrix by the corresponding column sum.
5. Develop the preference vector by computing the row averages for the normalized matrix.
6. Compute an overall score for each decision alternative by multiplying the criteria preference vector (from step 5) by the criteria matrix (from step 2d).
7. Rank the decision alternatives, based on the magnitude on their scores computed in step 6.

## RESULT AND DISCUSION

### Result.

Table.2 Result of Overall Criteria

Availability	Packaging	Advertisement	Product Variety	Brand	Quality	Price
0.03	0.05	0.08	0.10	0.11	0.23	0.33

Source: Data processed 2016

The highest score is price (0.33). It means that price is the factor that influences the most consumers in selecting cigarettes brand among the other criteria. The second highest influence consumers choice is quality (0.23), followed by brand in third position with score (0.11), product variety also with score (0.10), advertising with (0.08), and packaging go with score (0.05) and in the last position with score (0.03) is availability. In general, the degree of consistency is satisfactory (acceptable) if consistency ratio  $\leq 0.10$ . The consistency ratio of this result is 0.10. It means the data comparison in this result is valid and consistent.

Table.3 Result of AHP

Gudang Garam	Sampoerna	Marlboro
0.51	0.33	0.12

Source: Data Processed, 2016

Based on the observation, respondent choose Gudang Garam as the most preferred cigarette brand for among all alternatives. Gudang Garam have the highest score with score (0.5127), followed by Sampoerna in the

second position with score (0.3313), and the last place Marlboro with score (0.1448). In this result, the degree of overall consistency is satisfactory (acceptable) if consistency ratio  $\leq 0.10$ . The consistency ratio of this result is (0.08), it means the data comparison in this result is valid and consistent.

## **Discussion**

This research is designed to find out the consumer behavior in cigarettes selection among three Cigarette brands that are Gudang Garam, Sampoerna and Marlboro. The result obtained by using Analytical Hierarchy Process (AHP) as Multi-Criteria Decision Making (MCDM) method that helps decision maker to facing the complex options of alternative with various complex subjective criteria. This method is also useful to define the strength and weakness of each cigarette brands based on the criteria. Below is the discussion and explanation from the result of this research based on respondent's data. The respondents are people who have been eat at the three cigarette brands.

### **Pairwise Comparison for the Main Criteria Analysis**

Firstly, for the overall criteria, the most important criteria that influence consumer to choose a cigarettes is price with score (0,3329) because price is the first thing to come in consumer mind considering to choose the cigarettes brand. Being the most preferred criteria by respondent who have experience with the three brands, price has the highest score compare to the other criteria.

Second highest influence is quality with score (0.2688). When the consumer want to buy a cigarettes, quality is an important factor to select the cigarette. The quality of cigarette is important because usually people smoke a cigarette because the quality of the cigarette determine the amount of the nicotine and tar inside the cigarette which are make the cigarette save or not, consumer that choose the quality are those who choose the light cigarette to smoke. This is why quality is important criteria that influence the consumer to choose the cigarette.

In third place, brand is left with score (0,1120) which far behind from the second place. Consumer will choose a brand that already known well besides the small name brand. People usually trust the brand that already known by many other people. The image of the brand itself will be so influencing to consumer to buy the product, in this case is cigarette. That is why brand is important criteria that influence the consumer to choose the cigarette.

The forth place is the variety of the product. Because of the variety of the cigarette smoker, the product of the cigarette is also having a variation. The variation of the cigarette determines the consumer to choose the product which are mild, clove, or cigar. Every person has a different type of taste, so the variety of the product is also important to consumer to choose which kind of cigarette that the consumer want to buy.

The fifth is Advertisement. Advertisement is important because it show the identity of the brand. People are aware with advertisement because it is influence the mind of the consumer. Cigarette's company, usually make the advertisement with an interesting idea to attract the consumer. All the cigarette advertising, have never show the cigarette as the main role of the advertisement, and only the brand will showed in the end of the advertisement. And in that way, the consumer will not going to be offended by the advertisement, in the other meaning, it just going to attract the consumer more and more. That is why, advertising is also one of the important factor or criteria that influence the consumer to buy cigarette.

In the sixth place or the second last is packaging. In marketing, packaging is the "dress" of the product, which can play a role in whether the product sells in a new market or to new customer. In essence, packaging play a pivotal role in the branding process of the product especially cigarettes. Packaging has the same role as advertisement which is attracting consumer and proving consumer what they're looking for when they take the product. That is the important role of packaging which is one of the influential factors for consumer to buy cigarettes.

And in the last place is availability. Product availability is one of the key to consumer loyalty. Consumer usually looking for the product that they want, but if the product is not in the store the consumer may choose other brand in the store, that is why availability is an important factor for consumer to buy the cigarette product.

### **Pairwise Comparison Criteria within Three Cigarettes Alternatives Analysis**

Pair wise comparison criteria within three cigarettes brand alternatives show each firm performance on each criteria developed on Analytical hierarchy Process (AHP). From the result of price, Gudang garam is the

most preferred by respondent as indicated by its score of (0.52), compare to the other two brands, gudang garam seems like the most favorite brand with the most favorite price, the most affordable price compare to the other two brands. Second is Sampoerna (0.33), with a little more expansive than gudang garam by the respondent. But still the price is balance with the quality of the product of sampoerna. And followed by Marlboro with the lowest score (0.14), Marlboro is the most expansive one compare to the other two, Marlboro is expansive because this brand is a global brand besides the other two which are made in Indonesia. In the result of quality, Sampoerna is the most preferred brand as indicated by its score of (0.46), Sampoerna using a good quality tobacco to produced the cigarette compared with the other two brand. With the high quality of tobacco, sampoerna is able to attract the consumer to pick their product. Followed consecutively by Gudang Garam is also from inside the country product with score (0.42), and Marlboro in the last with score (0.13). In terms of advertising Gudang Garam leading the score with (0.49). means that gudang garam has the most attractive advertisement for their product. Second is Sampoerna with the score (0.31). In the last place Marlboro go with score (0.20). About Product Variety, shows that Sampoerna is the most preferred brand as indicated by its score of (0.49). with the amount of the variety of product, sampoerna shows that their product has the most variation that the consumer can pick. Followed by Gudang Garam (0.37), and Marlboro (0.14). About Brand, sampoerna is the most preferred brand as indicated by its score of (0.47), consumer choose sampoerna as their favorite brand, followed by Gudang Garam (0.38), and Marlboro (0.15). In terms of packaging, Gudang Garam leading the score with (0.49) gudang garam has the most attractive packaging. Not long ago, gudang garam was launched a new packaging for their product, with the new color, and also a new design. Second is Sampoerna with the score (0.31). In the last place Marlboro go with score (0.20).

### **Result of Analytical Hierarchy Process of Consumer Preferred Cigarette**

Based on data overall, respondent choose Gudang Garam as the most preferred cigarette brand for among all alternatives brand in Manado. The highest consumer preferred is confirming by the result of pairwise comparison of all criteria. Gudang Garam is highly chosen on two all of five criteria which are price and quality of the product.

In price, Gudang Garam always offer a satisfying and attracting price for consumer. Forget about other, Gudang Garam play in safe place for price, the company may think that price of the product is the main character to sell from the cigarette instead. The advertisement from the brand itself, is not as interested compared to the other alternatives brand. In quality of the product, Gudang Garam give the best quality of the material, besides is from the original country Indonesia, the company put a good taste of the product, so that the consumer are often to buy Gudang Garam because of a good quality with an affordable price.

## **CONCLUSION AND RECOMMENDATION**

### **Conclusions**

1. Based on seven criteria (price, quality, advertisement, product variety, brand, packaging, and availability), the top two criteria that has so much influence for consumer to choose cigarettes is Price and Quality.
2. Based on the overall result using Analytical Hierarchy Process (AHP) approach, show that Gudang Garam is the most preferred cigarette brand by chosen of the consumer, followed by Sampoerna, and Marlboro in the last position.

### **Recommendations**

1. Price is the most important thing that influence the consumer to make a decision to choose the cigarette brand. In this case, even when the quality is important, consumer will still choose the price as the most considerate criteria to choose the cigarette. Comparing the top three cigarette brand in Indonesia, even Sampoerna with the best quality of cigarette, and Marlboro is a global brand of cigarette, if the price is not match with the price that consumer want, consumer will still choose the most affordable one in this case is Gudang Garam. So that the cigarette brand with the most affordable price will be chosen by consumer.



2. Sampoerna and Marlboro must fix their weakness which is the price that not match with what the consumer want. Gudang Garam has attract the consumer to choose their product, make their brand as the most favorable cigarette brand in Manado.

### REFERENCES

- Philip Kotler, Gary Armstrong (2012). *Principles of Marketing. Fourteenth Edition*. PEARSON Global Edition. p. 458 ISBN 978-0-273-75234-1.
- Kuester, Sabine (2012): *MKT 301: Strategic Marketing & Marketing in Specific Industry Contexts*, University of Mannheim, p. 110.
- McDaniel, C., Lamb, C., & Hair, J. 2011. *Introduction to Marketing*. 11th ed.
- MACDONALD, E. K., & SHARP, B. M., 2000. *Brand Awareness Effects on Consumer Decision Making for a Common, Repeat Purchase Product: A Replication*. *Journal of Business Research*, Pages: 5-15.
- Shaharudin MR, Hassan AA, Mansor SW, Elias SJ, Harun EH, Aziz NA. 2010. *The relationship between extrinsic attributes of product quality with brand loyalty on Malaysia national brand motorcycle/scooter*. *Canadian Soc. Sci.*, 6(3): 170-182.
- Cannon, Joseph P., Perreault, Jr. William D., McCarthy, E.Jerome. (2008). *Pemasaran Dasar : Pendekatan Manajerial Global*. Edisi Keenam Belas. Salemba Empat Jakarta.
- KOTLER,P., WONG, SAUNDER & STRONG, 2005. *Principle of Marketing*. Prentice Hall.
- LIN, M. Y., & CHANG, L., 2003. *Determinants of Habitual Behavior for National and Leading Brands in China: Journal of Product and Brand management*, Pages: 94-107.
- Diane V., Ah, Sheryl Ebert., Anchalee Ngamvitroj., Najin Park., and Duck-Hee Kang., 2005. *Factors Related to Cigarette Smoking Initiation and Use among College Students*
- Jie-Min Le., Hui-Cheung Wang., and Sheng-Hung Chen.,2009. *Factors influencing smokers decision to consume light cigarettes*
- Vera Boadu.,2012.*A Study to Indicate Factors influencing The Buying Behavior of Cigarette smokers*.
- Rupert Nelson., Janine Paynter., and Bruce Arrol3.,2005. *Factors influencing cigarettes access behavior among 14-15-years-olds in New Zealand: a cross-sectional study*
- Malhotra N. K. 2009. *Basic Marketing Research. A Decision Making Approach* 3th Edition Prentice-Hall Inc, New Jersey
- Sekaran, U and Bougie, R. 2009. *Research Methods for Business : A Skill Building Approach*. 5th ed. Wiley.
- Saaty, T.L 2008, *Decision Making with the analytic hierarchy process*. Int. J. Service Science, Vol 1. No. 1.