
**SELECTING THE BEST SMARTPHONE USING ANALYTICAL HIERARCHY
PROCESS (AHP) METHOD (Case Study Lenovo, Asus and Oppo)**

*MEMILIH SMARTPHONE TERBAIK MENGGUNAKAN METODE ANALISIS PROSES HIRARKI
(Studi Kasus Lenovo, Asus dan Oppo)*

By

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Abstract: In Manado city almost of all the top smartphone brands can be met in this city because the high excitability of peoples in Manado that encourage them to buy smartphone and fulfil their curious of the several smartphone even the brand that not enter the Indonesian marketplace or in other words unfamiliar smartphones like several brands such as Lenovo, Asus and Oppo. Based on the research problem, the objectives of this research is to identify which smartphone people prefer the most. This research used quantitative method. Quantitative research seeks to quantify the data. The method used to this research is Analytical Hierarchy Process (AHP). AHP is a method for ranking data and selecting the best given criteria. The result of this research has showing Price, Durability and Hardware Specification are the most important criterias. Based on the result would be well advised to pay attention on Price, Durability and Hardware Specification before buying a Smartphone.

Keywords: *consumer needs, customer expectation, analytical hierarchy process.*

Abstrak: Di kota Manado hampir semua merek smartphone ternama dapat ditemui di kota ini karena kemauan masyarakat yang tinggi di Manado yang mendorong mereka untuk membeli smartphone dan memenuhi rasa ingin tahu mereka dari beberapa smartphone bahkan merek yang tidak masuk ke pasar Indonesia atau di negara lain. Katakanlah smartphone yang tidak dikenal seperti beberapa merek seperti Lenovo, Asus dan Oppo. Berdasarkan latar belakang masalah, tujuan penelitian ini adalah untuk mengetahui smartphone mana paling diminati pelanggan. Penelitian ini menggunakan metode kuantitatif. Penelitian kuantitatif adalah untuk mengukur data. Metode yang digunakan untuk penelitian ini adalah Analytical Hierarchy Process (AHP). AHP adalah metode untuk membuat perbandingan peringkat pada data dan memilih yang terbaik dari kriteria yang diberikan. Hasil dari penelitian menunjukkan bahwa Harga, Ketahanan dan Spesifikasi perangkat keras adalah kriteria paling penting. Berdasarkan hasil dari penelitian bahwa sangat disarankan untuk memperhatikan Harga, Ketahanan dan Spesifikasi Perangkat Keras sebuah Smartphone sebelum memutuskan untuk membeli sebuah Smartphone.

Kata Kunci: *kebutuhan konsumen, harapan pelanggan, proses analisa hirarki.*

INTRODUCTION

Research Background

Basically, human has been created not to live alone in this world. So that is why communication is very important to us in purpose conducting one to another as a social beings. In every informational needs and demands of a human cannot be denied that communication is needed to get any kind of information and to switch information one to another actually there is so many communication tools that we can use to give and gain information including verbal interaction mouth to mouth, body language or gesture to mention expressional information that we have send to destination so they will get what we feel, and last one is eye contact that sometimes can be a media to provide some emotional information without need to use verbal or gesture our eyes can send it some of human that have a good sensitivity of feeling.

There is so many smartphone brands sale their product in Indonesia including Apple, Samsung and Sony in High-End of segmentation entry and the lower entry such as Blackberry, Asus, Oppo, and Lenovo at Mid-End entry and the lower entry such as Evercoss, Hisense, Blueberry, Mito in Low-End entry and many more. At a moment it is very likely a competition to be the best smartphone that participated by the brand and categorized by their own segment and target market.

In Manado city almost of all the top smartphone brands we can meet in this city because the high excitability of people in Manado that encourage them to buy smartphone and fulfil their curious of the several smartphone even the brand that not enter the Indonesian marketplace or in other words unfamiliar smartphones like several brands such as Meizu, HTC, Alcatel and Nvidia. There is so many options to choose what your best smartphone depend on the criteria that influence the consumer needs, purchasing power and also Consumer Purchase Intention to every each of Brand Products.

Regarding with the circumstance above, this research will analyze some of those smartphones that most compatible with almost all social class that balanced the quality and price to meet the customers in Manado (in this case Lenovo, Asus, and Oppo) with the criteria's that can influence consumer to choose a smartphone, and try to find which smartphone that meet the customers expectation the most and which criteria's has influence the most people in selecting a smartphone. Based On Background Above, The Title Of This Research Is: "Selecting The Best Smartphones Using Analytical Hierarchy Process (AHP) Method (Case Study: Lenovo, Asus And Oppo)".

Research Objective

Based on the research problem, the objectives of this research is to identify which smartphone people prefer the most.

LITERATURE REVIEW

Marketing

Marketing is defined by Kotler and Keller (2012:27) is about identifying and meeting human and social needs. One of the shortest good definitions of marketing is "meeting needs profitably". Marketing involves more than just activities performed by 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 benefit all parties concerned. Marketing also entails an understanding that organizations have many connected stakeholder "partners," including employees, suppliers, stockholders, distributors, and society at large (McDaniel, Lamb and Hair, 2011:3).

According to Kotler and Amrstrong (2010:28) goal of marketing is to attract new customer by promising superior value and to keep and grow current customers by delivering satisfaction.

Consumer Behavior

Consumer behavior is defined as the behavior that consumers display in searching for purchasing, using, evaluating and disposing of products and services that they expect will satisfy their needs. Consumer behavior focuses on how individual make decisions to spend their available resources (time, money,effort) on

consumption related items (Schiffman and Kanuk, 2004:8). The field of consumer behavior covers a lot of ground: It is the study of the processes involved when individuals or group select, purchase, use or dispose of products, services, ideas, or experiences to satisfy needs and desires (Solomon, 2013:31). In its early stages of development, researcher prefer to the field as buyer behavior; this reflected an emphasis on the interaction between consumers and producers at the time of purchase. Most marketers now recognize that consumer behavior in fact an ongoing process, not merely what happens at the moment a consumer hands over money or a credit card and in turn receives some goods or services.

Smartphone

Smartphone basically are cellphone and handheld computer that created the greatest tech revolution since the Internet. A smartphone can do everything a personal computer can do, and because of its mobility, much more. Although screen size is a limitation, the increasingly higher resolutions make viewing pleasurable and voice recognition can eliminate a fair amount of typing.

Pricing

According to Erickson & Johansson (1985) price is one of the most important cues in marketplace. The economics and consumers elements can be used to interpret the view about price. Price is represented as constraint to be trade-off products for each unit with maximum utility from economics perspective. No hidden information exists in exchanging products in marketplace.

Previous Research

The first article is “Application of Analytical Hierarchy Process (ahp) to Prioritize the Factors Indian Consumers Consider While Buying Smartphones in india” Created By; Soham Chakraborty, Shashwat Srivastava, Karishma Das (2015) contains about Smart phones have almost become a necessity for Indian mobile phone users. The study clearly identifies and prioritizes the features Indian consumers consider while purchasing smart phones in India. Analytic Hierarchy Process is a decomposition multiple-attribute decision making (MADM) method, in this study it has been used for ranking of the features present in smart phones. A mathematical model based on pair-wise comparison values has been developed by applying AHP. In case of purchase of smart phones, pricing, durability, battery life, promotions and advertisements, camera resolution, configuration, storage and connectivity options are the main criteria which influence the features which customers consider while buying any smart phone in India. Thus the research objective is to prioritize the features related to smart phones while purchasing them from the Indian scenario. A country wide survey was conducted which included people from all age groups as well as industry experts from various mobile phone manufacturers. The medium of data collection was from online surveys and email, telephonic conversations, interview with company officials. The questionnaires was distributed among 2000 people nationwide from which 1981 positive responses were received which converted to percentage value comes to 99.05%. A successful survey is only possible when the questions are kept simple and to the point. This helps in the achieving valid, relevant and reliable data. Some of the sample questions have been tabulated below.

The second article is “Utilizing Analytic Hierarchy Process to Analyze Consumers’ Purchase Evaluation Factors of Smartphones” Created By; Yi-Chung Hu, Yu-Lin Liao (2013) show that the feature which Indian customers consider while purchasing smart phones is the Brand of the Smart phones. It is followed by the Operating system such as Android, Windows, IOs, etc. and then comes User experience functionality and so on. The feature which least affects the buying decision of Indian Smart phone buyers is the Design of Smart phones compared to all these given features. In the present advancement of Smart phone technology Affordability which earlier used to be a great determinant of purchasing decision is now on the lower side of the rankings. Analytic Hierarchy Process has been put into use for the calculation of the global priority weights of the Alternatives with respect to the Criteria considered for this study. The results seem pretty much satisfactory matching Smart phone buying trend among Indian customers belonging to different age groups. Hence by the application of AHP for the analysis of features affecting the Smart phone buying decision of Indian customers, it has been found that Brand is the best alternative. With such rapid development of new technology in the area of Smart phones in near future the present trend may change and considering these features along with many more added features, other statistical decision-making methods apart from AHP may be implemented for this study to obtain results showing the future trends.

The third article is “Incorporating AHP in DEA Analysis for Smartphone Comparisons” Created By; Tan Lean Peaw, Adli Mustafa (2006) In this paper, we have demonstrated a simple and easy-to-use technique for smartphones comparison via DEA. Furthermore, we integrated AHP in DEA to generate a more feasible DEA result. Various types of data modification are shown to adopt a more feasible data in DEA software without any modification of the DEA formula. The computerised DEA software, EMS presented single efficiency scores for the various smartphones as a final result with which to ease purchase decision. Manufacturers can use the DEA analysis’ result to benchmark their products and improve product performance as well. The results of the study can be adopted as reference data for mobile phone manufacturers in the future on the design and marketing strategy to satisfy the voice of customer that indicate the main choice factor of smartphones is software and hardware specifications. The first four most important criteria are central processing unit (CPU), operation platform, touch screen and battery life. Furthermore, it can use the coefficient of variance (CV) to judge the degree of consensus. The high consensus aspect and criterion are user interface and photograph function respectively. We can learn consumers’ chief considerations through AHP evaluation model. To expand the market share, the enterprises must create the features and services that meet consumer needs. As the development condition of the smartphone market is presented, the analysis can assist operators to find their improvement strategies of products and services for the smartphone market. The investigation demonstrates that consumers hold a high level of expectations with the usefulness of smartphones. Such results reflect why the functions of smartphones and other technology products must be continuously enhanced. Therefore, to meet the needs of consumers, the improvement of the smartphone’s functional dimension can facilitate conveniences of work and life. The research findings have also some practical implications, for example, designs of products and service, the development for application and the adoption of marketing strategies should take notice of consumers’ preferences. The proposed framework in this study is illustrated with respect to the perspectives of Taiwanese smartphone users; it can extend to explore the users’ preferences of different countries and compare the results in the future research.

RESEARCH METHOD

Type of Research

This is quantitative research 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, 2009:180).

Place and Time of Research

This research is conducted in Manado city. This research using the people who ever experienced or knew those three brands and also the Potential customers as the respondent. This research was prepared since May 2016.

Conceptual Framework

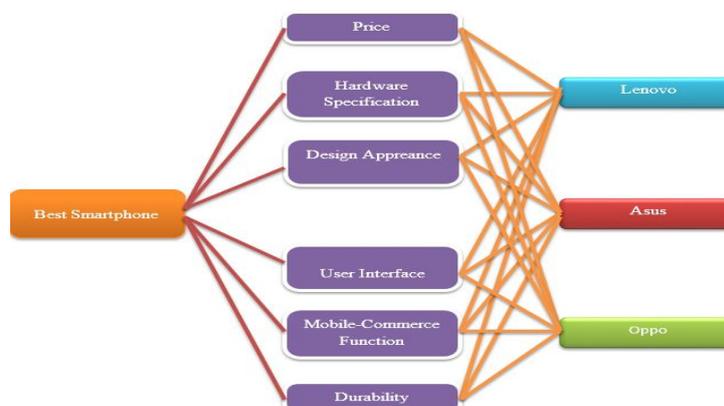


Figure 1. Conceptual Framework

Population and Sample

Population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate. It is the group of people, events, or things of interest for which the researcher wants to make inferences based on sample statistics (Sekaran and Bougie, 2009:262). Population in this research is people in Manado that have experienced using the three brands.

The sample of this research is all ever experienced or knew and also the potential customers of Lenovo, Asus, and Oppo as many as 30 respondents that already had experience, heard or plan to be a customers at those three smartphone. The sampling design is simple random sampling. According to Sekaran and Bougie (2009:278) this sampling design is best when the generalizability of the findings to the whole population is the main objective of the study.

Data Collection Method

The data collected on this research divided by two, there are Primary Data and Secondary Data. Primary data refer to information obtained first-hand by the researcher on the variables of interest for the specific purpose of the study (Sekaran and Bougie, 2009:180). Individuals provide information when interviewed, administered questionnaires, or observed. Group depth interviews, or focus groups, are another rich source of primary data. The primary data used in this research is questionnaire that will be distributed to respondents.

Secondary data refer to information gathered by someone other than the researcher conducting the current study (Sekaran and Bougie, 2009:184). The secondary data used in this research is taken from books, relevant literatures and journals from library and internet. Secondary data in this research were used in the research background, literature review and research methodology.

RESULT AND DISCUSSION

Result

Analytical Hierarchy Process (AHP) Result

In the Analytical Hierarchy Process (AHP) respondents shared their opinion by filling questionnaire, and determined which Smartphone was preferred and which criteria that had influenced most people to choose. In the Analytical Hierarchy Process, respondent scored their preferred alternative by using pairwise comparison. It means that they shared their choice by filling several questions in form of questionnaires, and determined which Smartphone was preferred based on each criterion developed in AHP. Then through this method of AHP, ranked decision alternative of smartphone were categorized based on several criteria of Smartphone selection criteria.

Result of the overall criteria

Smartphone criteria are the factors that influence people in selecting Smartphones, particularly in Manado. Smartphone criteria consist of Price, Hardware Specifications, Design Appearance, User Interface, Mobile-Commerce Function and Durability.

Characteristic of respondent based on Gender

The characteristic of respondents based on gender from 30 respondents. Most of the respondents are male with 12 respondents or 40% of respondents and the rest of respondents are female with 18 respondents or 60% of respondents.

Characteristic of respondent based on Age

The percentage of respondents based on age. The respondents are dominated by people aged between 20-23 years old with 17 respondents or 56% of respondents, 30% of respondents or 9 respondents are aged between 24-27 years old, and the same result goes to both respondents with sample age under 20 years old and over 27 years old with 7% (2 respondents each of them).

Characteristic of respondent based on Occupation

The most respondent in this research are student with 11 respondents or 37% of respondents, followed by respondents that have job not mentioned on the list with 7 respondents (23% of respondents), 6 respondents for civil employee (20% of respondents), and 6 respondents are civil servant (20% of respondents).

Table 1 Result of The Overall Criteria

Result	Product		
2,17520195			
1,073063697	2,32645		
0,556566579	1,13962	t=	6,293311547
0,314890036	0,56667	CI=	0,058662309
0,334337907	0,32333	RI6=	1,24
1,54593983	0,34223	CR=	0,047308314
	1,68999	<=0,1	Consistant

Source : Data Proceed, 2018

The table show overall inconsistency of all the Criterias 0.047308314. In general, the degree of consistency is satisfactory (acceptable) if overall inconsistency < 0.10. It means the data comparison in this result is valid and consistent.

Table 2 Pairwise of All Brand based on Criterias

Brand	Price	Hardware Spec.	Design App.	User Interface	Mobile Commerce	Durability
Lenovo	0,30	0,12	0,62	0,60	0,23	0,58
Asus	0,54	0,56	0,14	0,20	0,12	0,11
Oppo	0,16	0,32	0,24	0,20	0,65	0,31

Source : Data Proceed, 2018

The table show the rating of all the three brand based on the six criteria. Which is Lenovo has win as the highest score on Design Appearance (0,62) but has the lowest score on Hardware Specification (0,12), Asus has the highest score on Hardware specification but has the lowest score on Durability (0,11) and Oppo has the highest score on Mobile Commerce (0,65) but has the lowest score on Price (0,16)

Table 3 Result of AHP Best Smartphone

PV	
Lenovo	0,38
Asus	0,35
Oppo	0,27
	1,00

Source : Data Proceed, 2018

The table show the overall rating of the three brand based on all the criteria and the criteria rating itself based on how important the criteria and how the criteria can influence the consumer to make buying decision

Table 4 Result of AHP Best Smartphone

Criteria Compared	PV	Product
Price	0,36	2,32645
Hardware Spec.	0,18	1,13962
Design App.	0,09	0,56667
User Interface	0,05	0,32333
Mobile Comm.	0,06	0,34223
Durability	0,26	1,68889

Source : Data Proceed, 2018

The table shows Price becomes the most important criteria when they want to choose smartphone. When customer wants to choose smartphone, they choose the most affordable price. Because of mostly the customers of smartphone are students who still get money from their parents. So, the smartphone should not give the unaffordable price for the customers. Price has highest score criteria compare to the other Five criteria, being the most preferred criteria by respondents and the most crucial criteria that influence customer in selecting smartphone. The respondents are those who have experienced on each alternative provided which are the three smartphones based on the requirement of using AHP method. So in this research, according to the respondents, price becomes the most preferred factor for the customer in selecting smartphone in Manado.

Second position of criteria that influence customers is Durability. Durability is always been the one of factor that customer expecting when bought any devices. So, that is why the smartphone with best durability always have their own strength in customer sight, it will be useless when we choose a devices with all the perfections but just can be used in a short term period.

Third position of most important criteria is Hardware Specification. When people choose to any devices, they will consider the devices with the best capability. When we want to buy a smartphone naturally we will be attracted by the smartphone with highest specification because of the bigger capacity mean more ability the smartphone can provide such as High Definition Game just can be run on Smartphone with 2GB minimum RAM or the other example is Smartphone Memory that the bigger capacity of Memory can save more file or data.

The fourth position is Design Appearance is also one of the important criteria for people when they want to buy smartphone. This is because there are so many people that not truly understand about what the smartphone specification or what ability that the smartphone can provide. So, that is why the factor that can exactly attract the kind of people like that is design appearance. There is to factor that considered by the consumer to choose a smartphone based on the design appearance, those are because the smartphone has a unique or attractive design or the design is fit for the customer daily activity.

At the fifth place is Mobile-Commerce Function. This one is also important thing, because it is not only few customers that buy a smartphone for a business/occupational or commercial purpose. So, that is why they need the smartphone that can support their activities while in work or doing business.

And the last place is User Interface. User Interface is less important to customer because sometimes they choose to download a modification software rather than used the original one that brand serving so the the user interface can be viewed to what the customer want.

Table 5 Result of The Overall Criteria

t=	6,293311547
CI=	0,09777052
RI6=	1,24000000
CR=	0,07884719
$\leq 0,1$	

Source : Data Proceed, 2018

The table show overall inconsistency indicated of all the Smartphone Brands (0.07884719), In general, the degree of consistency is satisfactory (acceptable) if overall inconsistency < 0.10 . It means that the data comparison in this result is valid and consistent.

Pairwise comparison for the main criteria analysis

In Analytical Hierarchy Process (AHP), the criteria developed as the measurement of best smartphone has been compared. AHP determines the relative importance or weight of the criteria, to rank the criteria from most important to least important. A criterion with the highest average weight indicates the priority criterion among others. Firstly, for the overall of seven main criteria (Price, Hardware Specifications, Design Appearance, User Interface, Mobile-Commerce Function, Durability).

Price becomes the most important criteria when they want to choose smartphone. When customers wants to choose smartphone, they choose the most affordable price. Because of mostly the customers of smartphone are students who still get money from their parents. So, the smartphone should not give the unaffordable price for the customers. Price has highest score criteria compare to the other Five criteria, being the most preferred criteria by respondents and the most crucial criteria that influence customer in selecting smartphone. The respondents are those who have experienced on each alternative provided which are the three smartphones based on the requirement of using AHP method. So in this research, according to the respondents, price becomes the most preferred factor for the customer in selecting smartphone in Manado.

Pairwise comparison criteria within three Smartphones alternatives analysis

Almost in every criterion, Oppo not being the most prefer smartphone. It is because almost all the Oppo products has a higher price Compared to the competitors that has equal features and specifications. Customers prefer choose the smartphones that have a good price with long-lasting durability and also powerful specifications.

Result of Analytical Hierarchy Process of costumer preferred Smartphone

Based on the overall data, customer will choose Lenovo as the most preferred smartphone in Manado compared to the other alternatives. The result shows that when people want to buy Smartphone, they prefer to choose Lenovo as the most preferred smartphone among the other alternatives. Lenovo has the highest score, in the second position is Asus, and followed by Oppo in the last position.

CONCLUSION AND RECOMMENDATION

Conclusion

Based on seven criteria Price got the highest total score 0.36. According to the data comparison that developed in pairwise comparison of Analytical Hierarchy Process (AHP), price became the most preferred criteria for customer when buying a Smartphone.

Based on the overall result that developed using Analytical Hierarchy Process (AHP), shows that Lenovo become the most preferred Smartphone by the customers with score (0.38), in the second position is Asus with score (0.35), and Oppo in the last position with score (0.27).

Recommendation

Price has an important role in selecting a Smartphone. By respondents, price became the most important thing to consider which Smartphone they want to choose. In this case, Asus has the most affordable price compare to Lenovo and Oppo. Lenovo and Oppo should know who are the most customers. Based on the data, the most customers are students who still get money from their parents. So, Lenovo and Oppo should give more affordable price.

Durability is also important for the customer. So that is why Lenovo became the most preferred by the customer choice. Because Lenovo products can survive longer than Asus and Oppo.

One of the most criteria that customer preferred is Hardware Specification. When customers want to buy a smartphone naturally they expecting something powerfully that can handle all that they want. But the problem the more powerful the device also have higher price or even the price not high it will not have a good durability Until Lenovo answer and give the solution with conducting the three criterion and provide a device with worth price and specification with superb durability, that means good quality has been met.

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