
Mobile Phone Preferences Segmentation Using The K-Means Clustering in Indonesia

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Abstract: This study investigates consumer preferences for mobile phones in Indonesia using the K-Means Clustering method. Data from 114 respondents were analyzed to identify key characteristics and preferences, focusing on variables such as age, gender, income, brand, and features like storage, connectivity, design, and accessories. The results revealed six distinct clusters, each representing unique consumer segments, such as Tech-Savvy Seekers, Secure Tech Enthusiasts, Performance Prioritizers, Security-Centric Pragmatists, Style-Savvy Connectors, and Endurance Seekers. The segmentation process highlights significant differences in consumer behavior, with some clusters emphasizing high performance and advanced connectivity features, while others prioritize affordability, security, and design. Based on the STP (Segmentation, Targeting, Positioning) framework, two target segments were identified: Tech-Savvy Seekers and Endurance Seekers. These segments were selected due to their high purchasing power and strong demand for premium mobile phone features, including long battery life and powerful performance. The proposed value proposition for these target segments is "Empower Your Mobile Experience with High-End Performance and Unmatched Battery Life," emphasizing key product features that align with their preferences. Additionally, this study incorporates the 7Ps marketing mix to offer practical recommendations on product development, pricing strategies, distribution channels, promotional efforts, customer service, purchasing processes, and physical evidence. These findings provide valuable insights for businesses to develop targeted marketing strategies that better address the diverse needs of Indonesian mobile phone consumers.

INTRODUCTION

In today's modern world, technology has become a key part of daily life. With the need for fast and practical living, people rely more on technology, both for work and for simple communication. One piece of technology that has become essential is the smartphone. A smartphone is a simple and portable device that can connect to phone networks, making it a vital

tool for people. As technology advances, smartphone have developed into more than just a way to talk or send text messages; they are now used for taking photos, recording videos, browsing the internet, and storing important data. According to Hulasoh (2020) in Nuraliyah et al. (2022), smartphone represent a major development in technology.

Based on data from Newzoo, as reported by dataindonesia.id, Indonesia is one of the largest markets for smartphones in the world, with 192.25 million users, ranking just behind China, India, and the United States.

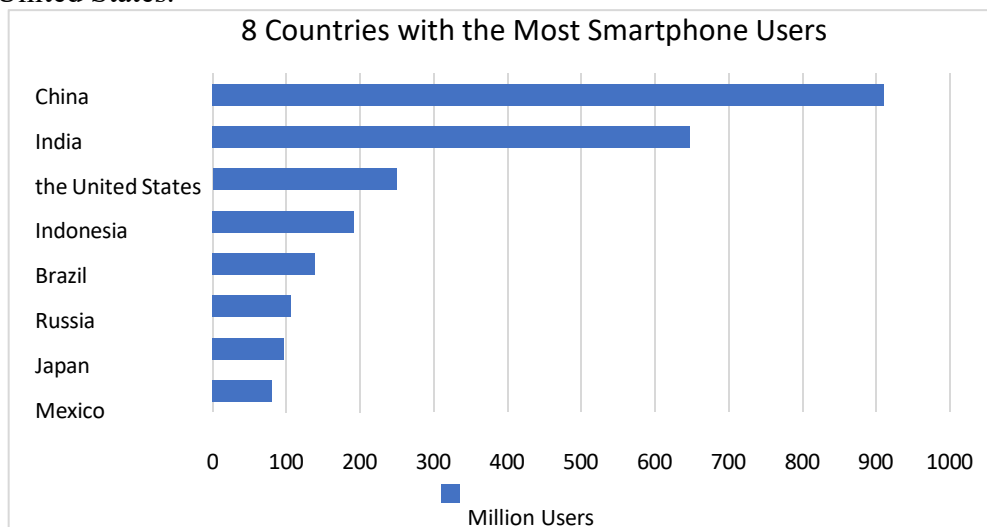


Figure 1. 8 Countries with the Most Smartphone Users

Indonesia is also one of the largest mobile smartphone markets in Southeast Asia, with significant annual sales growth. According to a recent report from GfK Indonesia, the total sales value of mobile phones in Indonesia reached IDR 48.9 trillion at the beginning of 2024. Devices with 8 GB RAM and 256 GB storage saw growth rates of 91% and 128%, respectively, compared to the same period last year. Meanwhile, sales of devices with less than 2 GB RAM, which now account for only 4% of total sales, are declining. Additionally, Indonesian consumers are shifting toward smartphones priced above IDR 7 million. This shift is mainly driven by interest in advanced features such as high-quality cameras, optimal gaming performance, and the growing popularity of generative artificial intelligence (AI). The 2024 Eid holiday also had a significant impact, with sales increasing by 6.2% compared to the previous year as many consumers used holiday bonuses to buy electronics, including smartphones.

In mid-2024, the International Data Corporation (IDC) released a report on the top five smartphone vendors with the largest market share in Indonesia for the first quarter (January-March) of 2024. These brands are Oppo, Samsung, Transsion, Vivo, and Xiaomi.

Table 1. Brands' Shares in the Indonesian Market

No.	Brand	Market Share Q1 2023	Market Share Q1 2024	Year over Year Growth
1	Oppo	19%	23,3%	8,5%
2	Samsung	17,3%	24%	-8,2%
3	Transsion	16,1%	5,4%	279%
4	Vivo	15,8%	16,5%	21,4%
5	Xiaomi	15,6%	13,7%	44,4%
Others		15,4%	17%	15,4%

Total	100%	100%	100%
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As shown in Table 1, in Q1 2024, Oppo led the market with a 19.9% share, shipping 1.99 million units out of a total of 10 million units during the period, resulting in an annual growth of 8.5%. Samsung ranked second with a 17.3% share but saw a decline of 8.2%, making it the only top five vendor with negative growth. Transsion, with brands like Infinix, Tecno, and iTel, ranked third with a 16.1% market share, showing an impressive annual growth of 279%, compared to just 5.4% in Q1 2023. Vivo and Xiaomi completed the top five, with Vivo holding a 15.8% share (1.58 million units) and Xiaomi at 15.6% (1.54 million units).

Despite the potential of the Indonesian smartphone market, intense competition poses significant challenges for companies. Brands like Oppo, Vivo, and Xiaomi must constantly innovate to retain market share, while new entrants like Transsion (Infinix, Tecno, iTel) are rapidly gaining ground. As shown in the IDC report, Transsion achieved a remarkable 279% year-over-year growth in Q1 2024. This intense competition highlights the importance of effective market segmentation and targeted marketing strategies to capture and retain diverse consumer groups.

The problem faced by companies in this competitive market is identifying and understanding the unique needs of different consumer segments. Without a clear understanding of consumer preferences, companies may struggle to create value propositions that resonate with target markets. Therefore, this study aims to address this issue by using K- Means clustering to analyze consumer segmentation in the Indonesian smartphone market. By grouping consumers based on their preferences for features, brands, and price points, the study seeks to provide actionable insights for companies to develop tailored marketing strategies.

An effective marketing strategy also requires a strong value proposition. In the smartphone industry, the value proposition includes a combination of features such as technological innovation, ease of use, attractive design, and competitive pricing. For example, brands like Oppo and Vivo highlight camera quality and premium design to attract middle-to-high-end consumers, while brands like Xiaomi offer a combination of affordable prices and high specifications to appeal to value-seeking segments.

To better meet market needs, the 7P concept (Product, Price, Place, Promotion, People, Process, and Physical Evidence) should be the key element in the marketing strategy. Product, in this case, refers to technological innovations that meet consumer needs, such as generative AI features, high-quality cameras, and long battery life. Price should be aligned with the purchasing power of the target segment, especially considering the trend of consumers moving to devices priced above IDR 7 million. Place refers to efficient distribution, both through physical stores and e-commerce platforms. Promotion involves creative campaigns that resonate with the target demographic, especially in the digital age dominated by social media. The People element, such as customer service, plays a crucial role in building loyalty. Meanwhile, Process refers to providing a smooth user experience, both during purchase and use. Finally, Physical Evidence, such as packaging and store design, helps reinforce the brand's image.

A study focusing on data mining research and K-Means Clustering, such as the current study, offer a great opportunity to combine the STP approach with the 7P strategy. According to Widodo (2013: 9), clustering or classification is a technique used to group data into several categories based on predefined similarities. In this case, a cluster is defined as a group of data objects that share high similarity within the same group and are significantly different from objects in other groups. Therefore, objects placed in the same cluster will show a high degree of

similarity with other objects in that group. According to Ediyanto (2013), cluster analysis is an unsupervised method in data mining, meaning it is done without labels or guidance. K- Means Cluster Analysis, a non-hierarchical clustering technique, aims to group objects into one or more clusters based on certain characteristics. Objects with similar characteristics are grouped together, while objects with different characteristics are placed in separate clusters.

By analyzing consumer data, such as preferences for phone features, brands, and demographics, this study aims to identify customer characteristics and how they prefer to use smartphones, especially in Indonesia, using K-Means clustering. The study also aims to help companies understand the needs of different consumer segments, so they can create value propositions tailored to each group. This way, companies can develop more targeted marketing strategies and compete more effectively in a fast-moving market.

METHOD

This study uses a quantitative approach with convenience sampling to identify consumer preference patterns for mobile phone features in Indonesia. The quantitative method is chosen because it allows for the systematic analysis of numerical data to identify specific patterns or relationships (Creswell, 2014). Convenience sampling was selected because it enables the researcher to easily collect data from available and willing respondents without strict selection criteria (Etikan, Musa, & Alkassim, 2016).

The target population of this study are mobile phone users in Indonesia. The study involves 114 respondents, whose preference data is considered sufficient to provide an initial overview of smartphone market segmentation in Indonesia. The primary data was collected through an online survey using Google Forms, making it convenient for respondents to fill out the questionnaire on their own.

The questionnaire is designed to gather information about the respondent's demographic characteristics, mobile phone purchasing behavior, and preferences for specific features such as storage capacity, camera quality, battery life, security, brand, and price. The questionnaire was distributed via social media platforms and online groups to reach a broad spectrum of mobile phone users.

The survey results were processed systematically using Microsoft Excel and KNIME Analytics Platform software. The first step in data processing involved exporting the respondent's answers into a table format in Microsoft Excel. The data was then classified into several variables corresponding to the aspects measured in the survey. Next, the data from Excel was imported into KNIME for further processing. During this process, nominal or categorical data was converted into numerical data to make it suitable for use with the K- Means Clustering algorithm. K-Means is a clustering method that works by dividing data into several groups (clusters) based on the distance between the data points. This method can only be used with numerical data. As part of partitioning clustering techniques, the K-Means algorithm divides the data into distinct clusters and allows the data to move from one cluster to another during the process. K-Means is known for its speed and efficiency, especially when handling large datasets, even those with outliers. The process starts by randomly selecting initial cluster centers (centroids) from the data population.

To determine the optimal number of clusters, we used the Optimized K-Means method with the Silhouette Coefficient as an evaluation indicator. Initially, all variables were included to find clustering patterns. The highest Silhouette Coefficient value was 0.11, indicating a possibility of improving clustering quality by selecting more relevant variables.

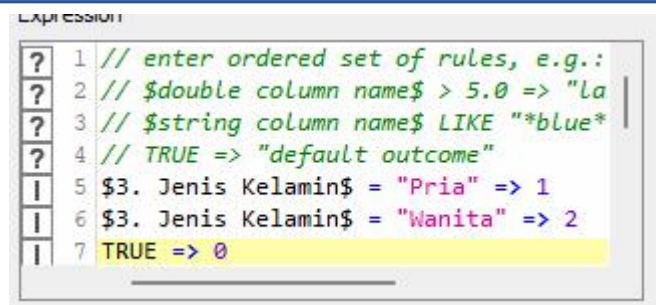


Figure 2. Examples of Categorical Data Converted into Numerical Data

To improve the clustering results, the researchers tried using a subset of variables that were more specific and deemed relevant to influencing individuals' decisions when selecting and purchasing mobile phones. These included 11 variables related to preferences, as provided in Table 2 below.

Table 2. Variables in the Study

No.	Variables
1	Age
2	Gender
3	Occupation
4	Income per month
5	Phone's Brand
6	Important Feature
7	Value for Money in Smartphones
8	The Significance of Smartphones's Design
9	The Significance of Smartphones's Storage
10	The Significance of Smartphones's Connectivity
11	The Significance of Smartphones's Accessories (Charger, Screen Protector, etc.)

The use of these specific variables improved the Silhouette Coefficient to 0.08, with the optimal number of clusters being eight clusters. The K-Means clustering method allowed for grouping the respondent's data into clusters based on similar patterns or characteristics, such as purchasing behavior, product preferences, or feature preferences. K-Means works by grouping data based on the distance to the cluster centers (centroids), which are iteratively calculated to find the underlying patterns in the data (Chaffey & Ellis-Chadwick, 2019). This method is relevant for analyzing mobile phone preferences because it can provide in-depth insights into consumer segmentation.

RESULT AND DISCUSSION

Respondent's Mobile Phone Brands

The table below presents the mobile phone brands most commonly used by the respondents, ranked from the most to the least popular.

Table 3. The Percentage of the Respondent's Phone's Brand

No.	Smartphone's Brand	Quantity	Percentage
1.	Apple	42	36,84%
2.	Samsung	40	35,09%
3.	Oppo	12	10,53%

4.	Xiaomi	9	7,89%
5.	Vivo	8	7,02%
6.	Infinix	3	2,63%
Total		114	100%

Based on the Table 3, it can be seen that Apple ranks first as the most commonly used brand among respondents, with 42 users or 36.84%. Samsung ranks second with 40 users, or 35.09%. Oppo follows in third place with 12 users (10.53%), while Xiaomi is in fourth with 9 users (7.89%). Vivo is in fifth place with 8 users (7.02%), and Infinix ranks sixth with 3 users (2.63%).

Cluster Analysis with the K-Means Method

This study used 11 variables to group 114 respondents based on their preferences when purchasing mobile phones, using K-Means clustering. The 11 variables are: Age (X1), Gender (X2), Occupation (X3), Income (X4), Mobile Phone Brand (X5), Mobile Phone Features (X6), Price-Quality Fit (X7), Attractive Design (X8), Large Storage Capacity (X9), Connectivity (X10), and Completeness of Mobile Accessories (X11).

The analysis produced 6 clusters with the following data:

Table 4. Variable and Cluster Data with K-Means Method

Variable		Cluster 0	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Age	15-24 years	0,00 0	0,00 0	0,30 4	0,00 0	0,07 7	0,06 7	0,25 0	0,00 0
	25-34 years	0,00 0	0,00 0	0,21 7	0,09 1	0,76 9	0,73 3	0,33 3	0,00 0
	35-44 years	0,00 0	0,00 0	0,39 1	0,09 1	0,07 7	0,00 0	0,25 0	0,06 3
	45-54 years	0,66 7	0,77 8	0,04 3	0,72 7	0,07 7	0,20 0	0,08 3	0,81 3
	> 55 years	0,33 3	0,22 2	0,04 3	0,09 1	0,00 0	0,00 0	0,08 3	0,12 5
Gender	Female	1,00 0	0,44 4	0,17 4	0,81 8	0,61 5	0,86 7	0,58 3	1,00 0
	Male	0,00 0	0,55 6	0,82 6	0,18 2	0,38 5	0,13 3	0,41 7	0,00 0

Occupation	Businessman	0,20 0	1,00 0	0,00 0	0,00 0	0,15 4	0,13 3	0,00 0	0,00 0
	Student	0,00 0	0,00 0	0,08 7	0,00 0	0,00 0	0,00 0	0,16 7	0,00 0
	Civil Servant	0,06 7	0,00 0	0,08 7	0,09 1	0,30 8	0,20 0	0,16 7	0,06 3
	Private-sector Employee	0,00 0	0,00 0	0,78 3	0,27 3	0,30 8	0,66 7	0,58 3	0,00 0
	Housewife	0,73 3	0,00 0	0,00 0	0,54 5	0,23 1	0,00 0	0,08 3	0,81 3
	Retired	0,00 0	0,00 0	0,04 3	0,09 1	0,00 0	0,00 0	0,00 0	0,06 3
	State Enterprises Employee	0,00 0	0,00 0	0,00 0	0,00 0	0,00 0	0,00 0	0,00 0	0,06 3
Income	< Rp1.000.000	0,00 0	0,00 0	0,04 3	0,00 0	0,00 0	0,00 0	0,08 3	0,00 0
	Rp1.000.000 - Rp3.000.000	0,13 3	0,00 0	0,17 4	0,36 4	0,00 0	0,13 3	0,08 3	0,18 8
	Rp3.000.000 - Rp6.000.000	0,13 3	0,00 0	0,13 0	0,09 1	0,38 5	0,00 0	0,33 3	0,06 3
	Rp6.000.000 - Rp10.000.000	0,20 0	0,00 0	0,26 1	0,36 4	0,61 5	0,66 7	0,33 3	0,12 5
	> Rp10.000.000	0,53 3	1,00 0	0,39 1	0,18 2	0,00 0	0,20 0	0,16 7	0,62 5
Phone's Brand	Apple	0,26 7	0,33 3	0,13 0	0,18 2	0,61 5	1,00 0	0,16 7	0,31 3
	Samsung	0,60 0	0,111	0,60 9	0,36 4	0,15 4	0,00 0	0,25 0	0,43 8
	Oppo	0,13 3	0,111	0,04 3	0,18 2	0,15 4	0,00 0	0,08 3	0,18 8

	Vivo	0,00 0	0,22 2	0,04 3	0,18 2	0,00 0	0,00 0	0,25 0	0,00 0
	Infinix	0,00 0	0,111	0,04 3	0,00 0	0,07 7	0,00 0	0,00 0	0,00 0
	Xiaomi	0,00	0,111	0,13	0,09	0,00	0,00	0,25	0,06
		0		0	1	0	0	0	3
Important Feature	Performance or Processor	0,06 7	0,33 3	0,56 5	0,18 2	0,53 8	0,33 3	0,33 3	0,12 5
	Security (Fingerprint sensor, face recognition)	0,06 7	0,22 2	0,00 0	0,18 2	0,15 4	0,26 7	0,00 0	0,12 5
	Camera	0,26 7	0,111	0,04 3	0,18 2	0,00 0	0,20 0	0,16 7	0,37 5
	Storage Capacity	0,46 7	0,22 2	0,30 4	0,36 4	0,23 1	0,13 3	0,41 7	0,25 0
	Battery Life Performance	0,13 3	0,00 0	0,00 0	0,09 1	0,00 0	0,06 7	0,08 3	0,00 0
	Connectivity (5G, NFC, dll.)	0,00 0	0,111	0,08 7	0,00 0	0,07 7	0,00 0	0,00 0	0,06 3
Value for Money in Smartphones		3,33 3	4,22 2	4,39 1	3,81 8	4,00 0	4,86 7	4,16 7	4,81 3
The Significance of Phone's Design		3,73 3	4,66 7	4,26 1	2,27 3	2,76 9	4,86 7	4,41 7	4,62 5
The Significance of Phone's Storage		4,80 0	5,00 0	4,95 7	2,90 9	5,00 0	4,93 3	4,25 0	5,00 0
The Significance of Phone's Connectivity (For example, 5G, NFC)		4,80 0	5,00 0	5,00 0	3,81 8	5,00 0	5,00 0	3,91 7	4,93 8
The Significance of Phone's Accessories (Charger, Screen Protector, etc.)		3,86 7	4,55 6	4,34 8	3,36 4	4,92 3	4,93 3	3,75 0	4,75 0

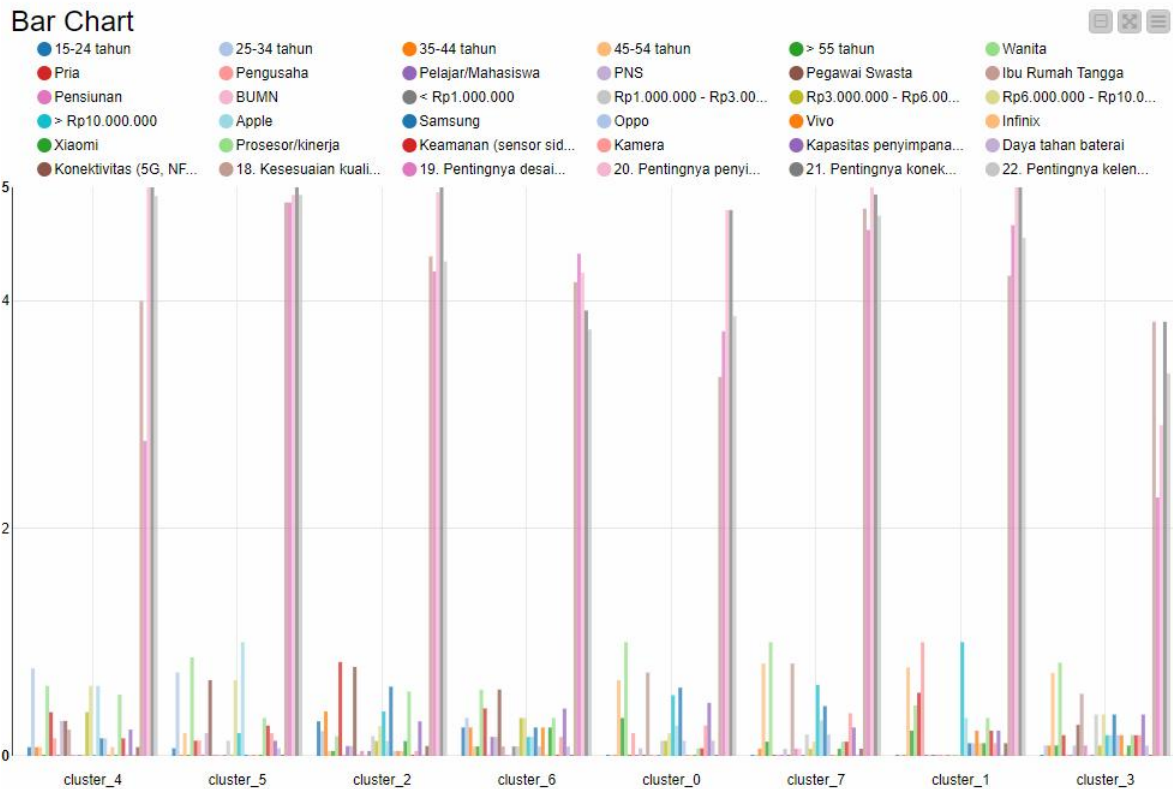


Figure 3. Variable and Cluster Graph in the Study Calculated with KNIME Software

These clusters form the basis for creating personas based on respondent's preferences for mobile phone use, as outlined below:

1. Cluster 0 Practical Keeper

Cluster 0 represents 13% of the study population. One of the respondents in this cluster is Reni, a 45-54-year-old housewife with a monthly income over IDR 10,000,000, who uses a Samsung phone. Reni strongly prefers practical features, particularly large storage capacity and modern connectivity like 5G or NFC. For her, smartphones serve as key tools for storing family memories through photos and videos, making storage space a high priority. Attractive design is considered moderately important, reflecting a functional rather than aesthetic focus. Accessories such as chargers, screen protectors, and earphones are also valued but not prioritized. This cluster is named Practical Keeper. To make it easier to explain the research discussion, the authors has created an illustration of the analysis, which can be seen in the following figure.



Figure 4. Cluster 0 Practical Keeper

In terms of STP analysis, this segment consists of women in urban areas with practical lifestyles and high digital needs. The targeting strategy is aimed at upper-class housewives who need large storage solutions, with a positioning statement of "Smartphones with unlimited space to store your precious moments." The value proposition includes products with large storage capacities to support family-oriented lifestyles, promoted through emotional storytelling to highlight the product's relevance in everyday life.

2. Cluster 1 Productivity Pro

Cluster 1 represents 8% of the study population. A respondent in this cluster, Ilham, a 45- 54-year-old businessman, has a monthly income over IDR 10,000,000 and uses an Apple phone. Ilham prioritizes phone performance, particularly the processor, as essential for supporting business needs and multitasking. He uses his phone primarily for work-related applications and productivity tasks, making large storage capacity and modern connectivity (e.g., 5G or NFC) crucial. Besides those aspects, attractive design and accessories such as chargers and screen protectors are seen as moderately important but are not the main priority.



Figure 5. Cluster 1 Productivity Pro

In STP analysis, this segment consists of professional men in urban areas with a strong focus on productivity and efficiency. The targeting strategy is aimed at entrepreneurs or high-level professionals in need of premium devices to support their work, with positioning as "Premium performance to support your big steps." The value proposition focuses on top processors for multitasking and business applications, with pricing communicated as an "investment" in technology to boost their working productivity. Additionally, the flagship product offering, combined with education on work efficiency, is highly relevant for capturing the attention of this segment.

3. Cluster 2 Efficient Achiever

Cluster 2 represents 20% of the study population. A respondent in this cluster, Akbar, a 35-44-year-old private-sector employee, has a monthly income over IDR 10,000,000 and uses a Samsung phone. Akbar values the processor and overall performance as the most important features in a phone, aligning with his need for efficiency. He finds the price-quality fit of his phone very appropriate. While design and large storage capacity are important, connectivity features such as 5G or NFC, and the availability of phone accessories such as phone charger, screen guard, and earphone, are also essential to him. This cluster is named Efficient Achiever. To make it easier to explain the research discussion, the authors has created an illustration of the analysis, which can be seen in the following figure.



Figure 6. Cluster 2 Efficient Achiever

In STP analysis, this segment includes men in urban areas who focus on balancing work efficiency with entertainment. The targeting strategy aims at men needing high- performance devices that can support both work applications like Google Workspace and provide a quality entertainment experience, with positioning as "Optimal performance for uninterrupted productivity." The value proposition includes mid-range smartphones with sufficient RAM and stable performance for multitasking. Additionally, the process involves easy integration with applications that support daily work activities. Emphasizing professional solutions and technology integration that supports an efficient lifestyle makes this group a key target for high-performance devices with pricing that matches their quality.

4. Cluster 3 Budget Keeper

Cluster 3, named "Budget Keeper," represents 10% of the study population and consists of individuals like Jenni, a 45-54-year-old housewife with a monthly income between IDR 1,000,000 and IDR 3,000,000. Jenni uses a Samsung phone and prioritizes large storage capacity as the main feature, which she considers very important for daily needs such as storing family photos and other important files. Good connectivity, such as 5G or NFC, and accessories like chargers, screen protectors, and earphones are also considered important, although phone design is not a top priority. The affordable price of the phone is seen as appropriate for its quality and is one of the key factors in her purchase decision.



Figure 7. Cluster 3 Budget Keeper

In the STP analysis, this segment includes housewives in suburban or rural areas with a simple lifestyle and limited budgets. Targeting is directed at users with the need for an affordable entry-level phone that still provides large storage to support daily activities, with a positioning statement of "Large storage at an affordable price for all your needs." The value proposition offered includes a product that is an entry-level phone with large storage capacity and a price with competitive pricing designed specifically for the low-budget segment. The focus on essential features that meet their needs makes this product appealing to the group seeking a functional solution at an economical cost.

5. Cluster 4 Elegant Performer

Cluster 4, named "Elegant Performer," represents 11% of the study population and consists of individuals like Ria, a 25-34-year-old woman who works as a civil servant (PNS) with a monthly income between IDR 6,000,000 and IDR 10,000,000. Ria uses an Apple phone and prioritizes phones with high-performance processors to support multitasking, as well as features like large storage capacity and advanced connectivity (5G or NFC), which she considers very important. Additionally, an attractive phone design and accessories such as chargers and screen protectors are also important to her. The phone's price is considered appropriate for the quality offered, with a balance between performance and aesthetics being a key factor in her purchase decision. To help present the research findings, a graphic of the analysis is provided and can be seen in the following illustration.



Figure 8. Cluster 4 Elegant Performer

In the STP analysis, this segment includes young civil servants in urban areas with a modern lifestyle who need multifunctional devices to support both administrative work and personal needs. Targeting is directed at individuals who require a high-performance phone with an elegant design for both professional and personal use, with a positioning statement of "Elegant design with high performance to support every step of your journey." The value proposition offered includes a product that is a mid-range phone with excellent performance, along with a promotion that includes productivity app bundles or special installment plans for civil servants. Focusing on administrative needs and lifestyle balance makes this device highly relevant to the segment, reflecting functional luxury that fits within their budget.

6. Cluster 5 Dynamic Professional

Cluster 5 represents 13% of the study population, and one of the respondents is Ayu, a 25-34-year-old woman working in the private sector. Ayu has a monthly income between IDR 6,000,000 and IDR 10,000,000 and uses an Apple phone. Ayu shows a strong preference for phone performance, especially a reliable processor, to support multitasking between work and entertainment. Large storage capacity and modern connectivity such as 5G or NFC are also considered very important. Meanwhile, an attractive phone design and accessories such as a charger and screen protector are deemed important, although they are not the main factors in her purchase decision. Ayu believes the price of the phone she uses matches the quality it offers. Cluster 5 is named "Dynamic Professional." To help explain the research discussion, the authors has provided a graphic of the analysis, which can be seen in the following illustration.



Figure 9. Cluster 5 Dynamic Professional

In the STP analysis, this group includes young professional women in urban areas with a dynamic lifestyle that prioritizes mobility and efficiency. Targeting is aimed at young professionals who need a robust device to support both work and entertainment, as well as long battery life to support their mobility, with a positioning statement of "Durable performance to support your professional lifestyle." The value proposition offered includes a mid-range phone as the product with solid performance for multitasking, equipped with long battery life, as well as customer service based on apps that meet the needs of the younger generation as the people aspect.

7. Cluster 6 Tech-Savvy Worker

Cluster 6 represents 11% of the study population, and one of the respondents is Lisa, a 25-34-year-old woman working in the private sector. Lisa has a monthly income between IDR 3,000,000 and IDR 10,000,000. This cluster uses phones from brands like Samsung, Vivo, or Xiaomi. The group prioritizes large storage capacity as a key feature in phones to support both work productivity and entertainment. In addition, modern connectivity such as 5G and NFC is considered very important. An attractive phone design and accessories such as chargers, screen protectors, and earphones are also seen as important, though not a primary consideration. The price of the phone relative to its quality is an important factor in the purchasing decision. Cluster 6 is named "Tech-Savvy Worker." To help explain the research discussion, the authors has provided a graphic of the analysis, which can be seen in the following illustration.



Figure 10. Cluster 6 Tech-Savvy Worker

In the STP analysis, this segment includes young professional women in urban areas who need multifunctional devices to support both productivity and a modern lifestyle. Targeting is aimed at women with a middle budget who are looking for feature-rich phones at an affordable price, with a positioning statement of "Smartphone with large capacity and advanced connectivity to meet your work and entertainment needs, without breaking your budget." The value proposition offered includes a product with large storage capacity (128GB/256GB) and modern technology like 5G and NFC to support multitasking activities.

8. Cluster 7 Family Documenter

Cluster 7 represents 14% of the study population, and one of the respondents is Rossa, a 45–54-year-old woman who is a housewife with a monthly income of more than IDR 10,000,000. Rossa uses a Samsung phone and places a high priority on camera quality for documenting family activities. Additionally, large storage capacity and modern connectivity such as 5G and NFC are also considered very important. An attractive phone design and accessories such as a charger, screen protector, and earphones are seen as important, but not the main factors. The price of the phone relative to its quality is the primary consideration in her purchasing decision. Cluster 7 is named "Family Documenter." To assist in explaining the research discussion, the authors has created a graphic of the analysis, which can be seen in the following illustration.



Figure 11. Cluster 7 Family Documenter

In the STP analysis, this segment includes upper-middle-class housewives in urban areas who need high-quality cameras to document family moments, with large storage to store photos and videos. Targeting is directed at modern housewives looking for devices with excellent camera quality and large storage capacity, with the positioning statement, “Capture every family moment with the best quality and ample storage.” The value proposition offered includes a product with a high-quality camera, large storage, and modern connectivity. Additionally, a promotional strategy through visual campaigns on social media showcasing family photos or video documentation would be a relevant marketing approach.

Among the eight clusters mentioned above, Cluster 5 places the highest importance on the alignment of the phone's quality with its price. Cluster 5 also emphasizes an attractive phone design when purchasing a phone. Clusters 1, 4, and 7 place significant importance on large phone storage. Clusters 1, 2, 4, and 5 prioritize better phone connectivity. Lastly, Cluster 5 places the highest preference on the completeness of phone accessories (e.g., charger, screen protector, earphones, etc.) when choosing a phone.

This study produced eight different consumer clusters using the K-Means Clustering method, which aims to identify target market segments more accurately. Each cluster is formed based on demographic characteristics, behavior, and consumer preferences for mobile phone features, so that each cluster has a unique persona.

As an illustration, the “Practical Keeper” cluster consists of high-income housewives who prioritize mobile phones with large storage capacity to support family needs. Meanwhile, the “Budget Keeper” cluster includes groups with lower incomes who are looking for entry-level mobile phones at affordable prices. There are also clusters such as “Elegant Performer” and “Dynamic Professional” which represent segments with more complex needs, ranging from attractive mobile phone designs to high performance for multitasking.

The results of this cluster analysis are then used to develop the right marketing strategy by applying the 7P concept—Product, Price, Place, Promotion, People, Process, and Physical Evidence. In terms of products, the features developed are adjusted to the specific needs of

each cluster. For example, a mobile phone with a high-quality camera for the “Family Documenter” cluster and a high-performance processor for the “Productivity Pro” cluster. The pricing strategy is also adjusted to the purchasing power of each segment, such as an entry-level price for the “Budget Keeper” and a premium price for the high-income cluster.

Distribution (Place) is designed to be able to reach all segments effectively, both through physical stores and e-commerce platforms. Promotion strategies (Promotion) are made different for each cluster, such as an emotional campaign for the “Practical Keeper” or a digital technology-based promotion for the “Tech-Savvy Worker.” In addition, the People element emphasizes friendly and personalized customer service to increase consumer satisfaction and loyalty. The Process focuses on the ease of buying and using a mobile phone, such as an easy-to-understand interface and adequate application support. Finally, the Physical Evidence element is strengthened through professional product and packaging design that is consistent with the brand image.

With a 7P strategy specifically designed for each cluster, this study offers guidance for companies in creating more relevant and effective products and marketing campaigns. This move not only increases competitiveness in the Indonesian smartphone market, but also ensures that the unique needs of each consumer segment can be better met.

CONCLUSION

The conclusion of this study focuses on analyzing consumer preferences for mobile phones in Indonesia using the K-Means Clustering method. Based on data analysis from 114 respondents, the study successfully identified six distinct consumer segments based on their mobile phone feature preferences, namely Tech-Savvy Seekers, Secure Tech Enthusiasts, Performance Prioritizers, Security-Centric Pragmatists, Style-Savvy Connectors, and Endurance Seekers. Each segment has unique characteristics based on demographics, income levels, and feature priorities.

In the STP (Segmentation, Targeting, Positioning) approach, segmentation was conducted by grouping consumers into these six clusters. The persona labels for each segment demonstrate that consumers have varying needs, ranging from a focus on technology and storage capacity to preferences for security, design, and battery life. Among these six segments, the prioritized target markets are Tech-Savvy Seekers and Endurance Seekers. These two segments were selected due to their high purchasing power and their tendency to choose mobile phones with advanced features that support their daily activities.

To meet the needs of the target segments, the proposed positioning strategy is to present mobile phones as products that offer optimal performance and exceptional battery life. This positioning is summarized in the value proposition "Empower Your Mobile Experience with High-End Performance and Unmatched Battery Life," emphasizing feature advantages that align with the target segments' needs.

This study can also be linked to the 7Ps concept in the marketing mix. From the product (Product) perspective, the offered mobile phones must include security features, long battery life, and strong processor performance. Regarding pricing (Price), a competitive pricing strategy should be applied to attract interest from the target consumers. In terms of distribution (Place), products should be made available through various channels, both online and offline, to increase accessibility. Promotion strategies (Promotion) should focus on digital campaigns that highlight product advantages relevant to the target market. In the people (People) aspect, companies need to ensure excellent customer service to enhance user experience. The purchasing process (Process) should be simple and convenient, particularly online, to provide ease for consumers. Lastly, the

physical evidence (Physical Evidence) can be strengthened by offering appealing and innovative packaging designs.

By integrating the STP approach and 7Ps framework into consumer preference analysis, this study provides comprehensive guidance for companies to develop more effective marketing strategies that focus on meeting the specific needs of each identified consumer segment.

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