



# Implementation of the Exponential Comparison Method (MPE) in E-Commerce Satisfaction Selection in Gang Ranim

<sup>1st</sup>Karan Alifian Mulya <sup>2nd</sup>Feri Alpiyasin

<sup>1st</sup>Teknik Informatika Sistem Informasi, STMIK Mardira Indonesia, <sup>2nd</sup> Teknik Informatika Sistem Informasi, STMIK Mardira Indonesia

<sup>1st</sup>kmalfn@gmail.com, <sup>2nd</sup>ferialpiyasin@gmail.com

**Abstract** The development of e-commerce provides many platform options for people to conduct online buying and selling transactions. The large number of e-commerce alternatives often makes it difficult for users to determine the most satisfactory platform. This study aims to implement the Exponential Comparison Method (MPE) as a decision support system to determine the level of satisfaction with e-commerce in the Gang Ranim area. The criteria used include user friendliness, ease of transaction, product quality, delivery speed, and seller service. The MPE method was chosen because it is able to provide a more explicit weighting of the level of importance of criteria through an exponential function. The results of the study indicate that the MPE method can help users in determining e-commerce with the best level of satisfaction objectively and systematically.

**Keywords:** Decision Support System, Exponential Comparison Method, Customer Satisfaction, E- Commerce;

*Abstrak* Perkembangan e-commerce memberikan banyak pilihan platform bagi masyarakat dalam melakukan transaksi jual beli secara daring. Banyaknya alternatif e-commerce seringkali menimbulkan kesulitan bagi pengguna dalam menentukan platform yang paling memuaskan. Penelitian ini bertujuan untuk mengimplementasikan Metode Perbandingan Eksponensial (MPE) sebagai sistem pendukung keputusan dalam menentukan tingkat kepuasan e-commerce di wilayah Gang Ranim. Kriteria yang digunakan meliputi kemudahan pengguna, kemudahan transaksi, kualitas produk, kecepatan pengiriman, dan pelayanan penjual. Metode MPE dipilih karena mampu memberikan pembobotan yang lebih tegas terhadap tingkat kepentingan kriteria melalui fungsi eksponensial. Hasil penelitian menunjukkan bahwa metode MPE dapat membantu pengguna dalam menentukan e-commerce dengan tingkat kepuasan terbaik secara objektif dan sistematis.

**Kata Kunci:** Sistem Pendukung Keputusan, Metode Perbandingan Eksponensial, Kepuasan Pelanggan, E-Commerce;

## INTRODUCTION

The development of information technology has driven the increasing use of e-commerce as a means of buying and selling. E-commerce makes it easy for people to access a variety of products and services without the constraints of time and space. However, the multitude of available e-commerce platforms often makes it difficult for users to determine the most appropriate option and achieve optimal satisfaction.

E-commerce user satisfaction is influenced by various factors, such as application ease of use, ease of transaction, product quality, delivery speed, and seller service. Therefore, a systematic approach is needed to assist users in making decisions. Decision Support Systems (DSS) are one solution that can be used to address this issue.

The Exponential Comparison Method (MPE) is a DSS method that provides assessments based on the importance of criteria using an exponential scale. This method is considered capable of producing more accurate decisions because it emphasizes differences in importance between criteria. This study implemented the MPE method in determining e-commerce satisfaction levels in Gang Ranim.

### 2.1. E-Commerce Customer Satisfaction

Customer satisfaction is the level of user satisfaction after comparing perceived performance with expectations. In the context of e-commerce, satisfaction is influenced by system quality, information quality, service quality, and transaction experience.

### 2.2. Decision Support System

A DSS is a computer-based system designed to assist decision-makers in dealing with semi-structured, multi-criteria problems. This system combines data, models, and a user interface to support objective decision-making (Turban & Aronson, 2020). In this study, the DSS concept was used as an approach to quantitatively guide the selection process for the chief executive, although it was not developed into an application.

### 2.3. Exponential Comparison Method

The MPE method is a method in DSS that calculates alternative values based on exponential weighting for each criterion. This approach produces a total score that can be used to determine the ranking of the most preferred platforms. The MPE is often chosen because it is simple yet allows for a clearer depiction of value differences.

MPE Formula:

$$\text{Total Value (TNi)} = (\text{RKij}) \text{TKKj}$$

1. TNi is the total value of the i-th alternative.
2. RKij is the level of importance.
3. The relative importance of the j-th criterion for each i-th alternative.
4. TKKj is the level of importance of the j-th decision criterion (TKKj is greater than 0).
5. m is the number of criteria. The MPE stages include:
  1. Determining the alternatives to be evaluated.
  2. Determining the criteria and their weights.
  3. Assessing alternatives against each criterion.
  4. Calculating the exponential value.
  5. Summing the total alternative values.
  6. Determining the final ranking.

## METHODOLOGY

This research uses a quantitative approach by combining literature studies, field data collection, and mathematical calculations using the Exponential Comparison Method (MPE). The research stages begin with determining e-commerce satisfaction criteria based on observations and discussions with the community in the Gang Ranim area, then continued with the distribution of assessment questionnaires to respondents who actively use e-commerce services. The data obtained is then processed through the MPE method calculation stage to produce a preference value for each alternative, which is then used as a basis for compiling analysis results and recommendations for e-commerce with the best level of satisfaction.

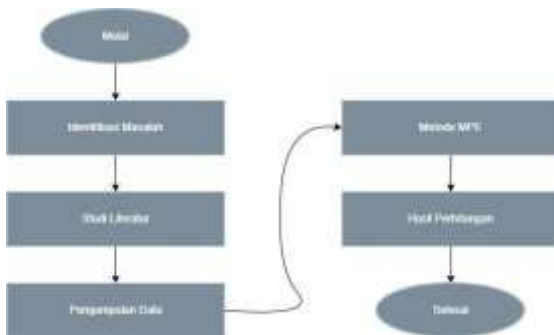


Figure 1. Research Stage

The figure illustrates the work process or steps used in using the MPE method. This process begins with:

#### a. Problem Identification Process

The initial stage of the research was conducted to observe and understand the main problems encountered in the process of selecting an e-commerce platform that provides the best level of satisfaction for residents in the Gang Ranim area. The problem identified was the large number of e-commerce options available, each with its own advantages and disadvantages, which often makes it difficult for users to determine the platform that best suits their

needs. Therefore, a more structured and objective decision-making method is needed to assist users in systematically evaluating and determining their level of e-commerce satisfaction.

#### b. Literature Review

In this stage, the researcher collected and studied various references related to decision support systems, multi-criteria decision-making methods, and theories and concepts related to the Exponential Comparison Method (MPE). The literature review also included studies on customer satisfaction and e-commerce as the research object. The references used came from books, scientific journals, and relevant previous research. This literature review served as a theoretical foundation for formulating criteria, determining research methods, and as a reference for analyzing and discussing research results.

#### c. Data Collection

Data collection was conducted by distributing questionnaires to respondents residing in the Gang Ranim area and actively using e-commerce services. Respondents were asked to rate each e-commerce alternative based on predetermined satisfaction criteria: Ease of Use, Ease of Transaction, Product Quality, Delivery Speed, and Seller Service. The assessment data obtained from the questionnaires were then used as the primary input in the calculation process using the Exponential Comparison Method (EMR).

d. Exponential Comparison Method (EMR)

At this stage, all questionnaire data obtained from respondents was processed using the Exponential Comparison Method (EMR). The processing process The data includes determining the importance weight for each e-commerce satisfaction criterion, calculating exponential values based on the assessment scores and criterion weights, and summing the preference scores for each e-commerce alternative. The resulting final score indicates the level of satisfaction for each alternative based on the relevant criteria, which is then used as the basis for the ranking process and determining the e-commerce platform with the highest level of satisfaction in the Gang Ranim area.

e. Calculation Results

This stage produces a total preference score for each e-commerce alternative, obtained through a calculation process using the Exponential Comparison Method (MPE). These preference scores are then compared to determine the ranking of each alternative based on user satisfaction levels. The e-commerce alternative with the highest score is deemed the platform with the highest level of satisfaction. These ranking results then serve as the basis for drawing conclusions and developing recommendations for the most appropriate e-commerce platform for the community in the Gang Ranim area.

**RESULT AND DISCUSSION**

Based on calculations using the MPE method, preference scores were obtained for each e-commerce alternative. The alternative with the highest preference score indicated the highest level of satisfaction according to users in Gang Ranim. The ranking results demonstrate that the MPE method is able to clearly differentiate alternatives based on user satisfaction levels, products and ease of transactions, so that the decision results are more relevant to user needs.

Alternatif - Alternatif	
E-Commerce	Shopee
	Tokopedia
	Lazada
	Blibli

After determining the e-commerce alternatives to be evaluated, the next step is to establish the criteria and their assessment attributes. The criteria were determined through interviews and questionnaires distributed to residents in the Gang Ranim area who actively use e-commerce services, with the aim of ensuring that the criteria used truly reflect the level of user satisfaction. The five criteria used in this study include User Ease, Ease of Transaction, Product Quality, Delivery Speed, and Seller Service. Each criterion is then classified into benefit or cost attributes, where the benefit attribute indicates that the higher the value obtained, the better the level of user satisfaction, while the cost attribute indicates that the lower the value obtained, the better the assessment results.

Kriteria	Atribut	Kriteria keputusan (evaluasi Alternatif)	SKALA Konvers
Kemudahan Pengguna	Benefit	Sangat tidak baik	1
Kemudahan Transaksi	Cost	Tidak baik	2
Kualitas Produk	Benefit	Cukup	3

In addition to determining the criteria attributes, the researchers also established a conversion scale for the assessment used in the evaluation process. The scale ranges from 1 to 5, representing the quality level of the assessment, ranging from "Very Poor" to "Very Good." This scale is applied to all e-commerce satisfaction criteria, namely User Ease, Transaction Ease, Product Quality, Delivery Speed, and Seller Service. Each qualitative value is then converted into a numerical value for processing in the calculation stage using the Exponential Comparison (ERP) method. This conversion process aims to simplify data processing and produce objective and measurable assessments.

Kriteria	Rentang Nilai	Konversi Nilai
Kemudahan	Sangat Sulit Digunakan	1
	Sulit Digunakan	2
	Cukup Mudah	3

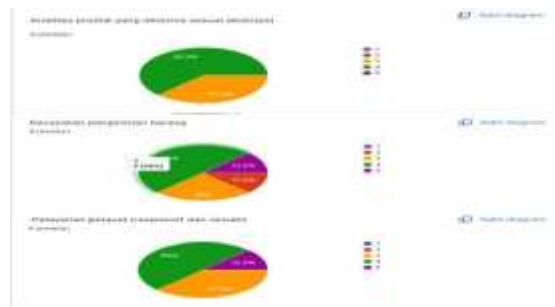
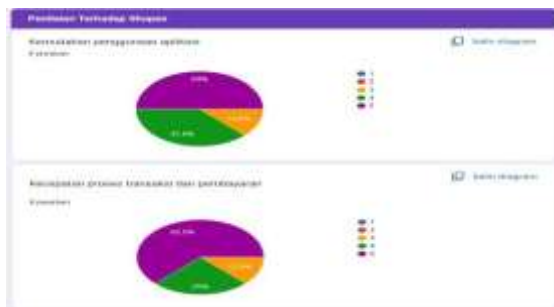
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Pengguna	Mudah Digunakan	4
	Sangat Mudah Digunakan	5
Kemudahan Transaksi	Sangat Rumit	1
	Rumit	2
	Cukup Mudah	3
	Mudah	4
	Sangat Mudah	5
Kualitas Produk	Sangat Buruk	1
	Buruk	2
	Cukup	3
	Baik	4
	Sangat Baik	5

In addition to determining the criteria attributes, the researchers also established a conversion scale for the assessment used in the e-commerce satisfaction evaluation process in the Gang Ranim area. The assessment scale used has a value range of 1 to 5, where the value represents the level of assessment quality ranging from "Very Unimportant" to "Very Important." This scale was applied to all criteria used in the study, namely Ease of Use, Ease of Transaction, Product Quality, Delivery Speed, and Seller Service. Each qualitative assessment was then converted into a numerical form so that it could be processed mathematically in the calculation stage using the Exponential Comparison Method (MPE). This conversion process aims to produce an objective, consistent, and measurable assessment in determining the level of e-commerce satisfaction that is most appropriate for the Gang Ranim community.

The next stage was data collection through the distribution of questionnaires to residents in the Gang Ranim area who actively use e-commerce services. Respondents were asked to provide an assessment of each e-commerce alternative based on five predetermined criteria, namely Ease of Use, Ease of Transaction, Product Quality, Delivery Speed, and Seller Service. The questionnaire was compiled using a rating scale of 1 to 5, where a value of 1 indicates a condition of "Very Poor", while a value of 5 describes a condition of "Very Good". Based on the results of filling out the questionnaire, an average value was obtained for each e-commerce alternative on each criterion, which was then used as input in the calculation process using the Exponential Comparison Method (MPE).



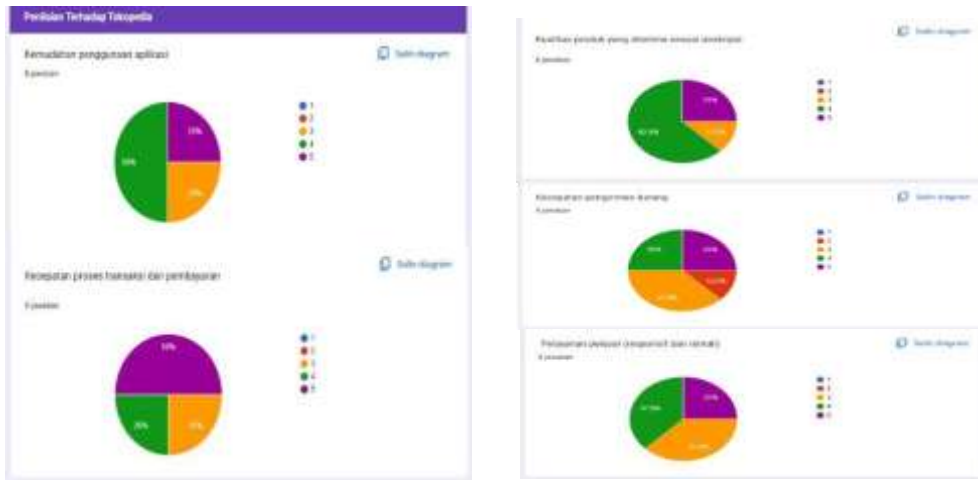
From the data results above, the customer satisfaction criteria for the Shopee E-Commerce Platform can be calculated as follows:

Kriteria	Nilai
Kemudahan Pengguna	5
Kemudahan Transaksi	5
Kualitas Produk	4
Kecepatan Pengiriman	4
Pelayanan Produk	4

Next, the data collected on the Tokopedia E-Commerce Platform:

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From the data results above, the criteria values obtained for customer satisfaction with the Tokopedia E-Commerce Platform are:

Kriteria	Nilai
Kemudahan Pengguna	4
Kemudahan Transaksi	5
Kualitas Produk	4
Kecepatan Pengiriman	3
Pelayanan Produk	4

Next, the data collected on the Lazada E-Commerce Platform:



From the data results above, the criteria values obtained for customer satisfaction with the Lazada E-Commerce Platform are:

Kriteria	Nilai
Kemudahan Pengguna	5
Kemudahan Transaksi	5
Kualitas Produk	3
Kecepatan Pengiriman	4
Pelayanan Produk	4

Next, the data collected on the Blibli E-Commerce Platform:

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From the data results above, the criteria values obtained for customer satisfaction with the Blibli E-Commerce Platform are:

Kriteria	Nilai
Kemudahan Pengguna	4
Kemudahan Transaksi	4
Kualitas Produk	4
Kecepatan Pengiriman	4
Pelayanan Produk	4

After the assessment data from respondents for each criterion against the alternative has been collected, then group the assessment data by criteria and alternative, namely:

Alternatif	Kriteria	Nilai	Konversi Nilai
Shopee	Kemudahan Pengguna	Sangat Mudah Digunakan	5
	Kemudahan Transaksi	Sangat Mudah	5
	Kualitas Produk	Baik	4
	Kecepatan Pengiriman	Cepat	4
	Pelayanan Penjual	Memuaskan	4
Tokopedia	Kemudahan Pengguna	Mudah Digunakan	4
	Kemudahan Transaksi	Sangat Mudah	5
	Kualitas Produk	Baik	4
	Kecepatan Pengiriman	Cukup Cepat	3
	Pelayanan Penjual	Memuaskan	4
Lazada	Kemudahan Pengguna	Sangat Mudah Digunakan	1
	Kemudahan Transaksi	Sangat Mudah	4
	Kualitas Produk	Cukup	3
	Kecepatan Pengiriman	Cepat	4
	Pelayanan Penjual	Memuaskan	5

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Blibli	Kemudahan Pengguna	Mudah Digunakan	4
	Kemudahan Transaksi	Mudah	4
	Kualitas Produk	Baik	4
	Kecepatan Pengiriman	Cepat	4
	Pelayanan Penjual	Memuaskan	4

After all the data is collected, the next step is to calculate the total value (TN) using an equation. The calculation involves multiplying the customer's data value by the weighted value of each criterion's importance level. The following is the calculation process for the Total Value (TN) for each alternative:

$$\begin{aligned}
 TN1 &= 5^4 + 5^5 + 4^5 + 4^4 + 4^4 \\
 &= 625 + 3125 + 1024 + 256 + 256 \\
 &= 5286
 \end{aligned}$$

$$\begin{aligned}
 TN2 &= 4^4 + 5^5 + 4^5 + 3^4 + 4^5 \\
 &= 256 + 3125 + 1024 + 81 + 256 \\
 &= 4742
 \end{aligned}$$

$$\begin{aligned}
 TN3 &= 5^4 + 5^5 + 3^5 + 4^4 + 4^4 \\
 &= 625 + 3125 + 243 + 256 + 256 \\
 &= 4505
 \end{aligned}$$

$$\begin{aligned}
 TN4 &= 4^4 + 4^5 + 4^5 + 4^4 + 4^4 \\
 &= 256 + 1024 + 1024 + 256 + 256 \\
 &= 2816
 \end{aligned}$$

After the calculation is complete, the final value is obtained. Then, a ranking is performed, looking at the values from largest to smallest. The ranking obtained by each alternative is as follows:

Alternatif	Nilai	Rangking
Shopee	5386	1
Tokopedia	4742	2
Lazada	4505	3
Blibli	2816	4

Based on these results, it can be concluded that customers are more satisfied with the Shopee E-Commerce Platform than other E-Commerce Platforms based on the MPE method calculation.

**CONCLUSION**

Based on the research results, it can be concluded that the Exponential Comparative Method (MPE) can be successfully implemented in assessing e-commerce satisfaction in Gang Ranim. This method is capable of providing objective and systematic decision-making results based on predetermined criteria and levels of importance. This research is expected to serve as a reference for the development of decision support systems in the e-commerce sector.

**Recommendations**

This research focused solely on the calculation process without developing a decision support system in the form of an application. Therefore, further research is recommended to develop the MPE method into a web-based application to automate and more efficiently conduct the assessment process.

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