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Recommendation System for Determining the Best Banner Supplier Using Profile Matching and TOPSIS Methods

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Abstract—Background: Choosing a banner supplier is a significant challenge for digital printing companies due to the various advantages offered by each supplier, often leading to selections based on subjective aspects such as price and quality. **Objective:** This research aims to develop a system that determines the best banner supplier to minimize production inefficiencies and maximize profits by comparing two calculation methods, Profile Matching and TOPSIS. **Methods:** A quantitative study was conducted using transaction data from the last six months. The parameter criteria used in this system include price, quality, delivery, availability, and payment terms. The study compares the effectiveness of Profile Matching and TOPSIS methods in identifying the best supplier. **Results:** The study results show that the TOPSIS method is superior, yielding 100% accuracy, 84% recall, and a 92% F1-score, outperforming the Profile Matching method. This demonstrates that the correct method and algorithm effectively provide the best alternative recommendations. **Conclusion:** The results indicate that using the TOPSIS method leads to more accurate and objective decisions based on predetermined criteria. The findings suggest that further research should focus on refining these methods to enhance decision-making in supplier selection.
Keywords—DSS; System Recommendation; Banner Supplier Selection; Profile Matching Method; TOPSIS Method; Performance Algorithm

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I. INTRODUCTION

Digital printing is a modern printing technology that transfers digital images or graphics processed by a computer onto the surface of materials or physical media through a digital printing machine[1]. The commonly produced products from digital printing are posters, stickers, brochures, and business cards; the most popular product is banners[2]. Banners are highly sought after because they serve as informational media and promotional tools for products, thus boosting business sales. However, as the demand for banners increases, the number of suppliers offering banner production materials also grows. Each supplier has its strengths and weaknesses. Generally, most suppliers are similar but possess distinct characteristics that set them apart [3], [4].

However, the variety of advantages each supplier offers for banner production materials has made it challenging for some digital printing companies to determine the right supplier. In many cases, the selection of suppliers has been based solely on subjective aspects such as price (cost) and quality without a more objective evaluation[2], [5]. Choosing the right supplier is crucial to avoid losses and improve the efficiency of the banner production process. This means that the supplier should be able to deliver orders on time, provide high-quality banners, and offer competitive and more affordable prices.

The difference between this research and previous research is that while previous studies have focused on methods such as Profile Matching and TOPSIS individually, this research compares both methods to identify which provides more accurate recommendations for supplier selection. Previous research using the Profile Matching method assisted store owners in providing recommendations or considerations for selecting suppliers when restocking their inventory[6]. Profile matching is a component of Multi-Criteria Decision Making (MCDM)[7], [8], [9]. Another study assisted company management in selecting suppliers for chemical materials[10]. Further, research using the TOPSIS method provided decision-making recommendations and was implemented in companies to procure raw materials[7] Balioti et al.[12] focuses on designing TOPSIS for multiple criteria decision-making problems with fuzzy data and devises an algorithm to identify the most favorable option among available alternatives. Khorram Niaki et al.[13] evaluated the MADM method for selecting the most suitable prototyping system according to the final product requirements. This method considers multiple attributes, including uncertain and precise data such as accuracy, surface roughness, strength, production cost, and lead time. A modified TOPSIS decision-making method was proposed to analyze quantitative and qualitative data to determine the ranking among prototyping systems.

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Previous research by Negi et al.[14] has introduced a grey-based approach utilizing the TOPSIS concept to address uncertainty in supplier selection assessments. This method was compared with grey relation analysis and other grey methods. The findings indicate that this approach effectively resolves supplier selection issues compared to existing methods. Kabadayi et al.[15] proposed a multi-objective programming approach for supplier selection in a JIT environment, allowing simultaneous trade-offs between price, delivery, and quality. The analysis was conducted within a decision support system, providing decision-making and volume allocation flexibility. Lie et al.[16] investigated MAGDM with incomplete weight information, converting the linguistic term sets (LTSs) into probabilistic linguistic term sets (PLTSs), and constructing an optimization model based on TOPSIS. The results indicated a practical and computationally straightforward approach to processing probabilistic linguistic information. Atthirawong[17] evaluates and ranks suppliers using the TOPSIS method, with an example in herbal cosmetics and personal care products from a Thai OTOP producer. The findings of this study can assist small enterprises in more precise supplier evaluation. A previous study[18] highlights the importance of incorporating environmental criteria into traditional supplier selection to support green supply chain management. It addresses the challenges faced by procurement professionals in green supplier selection and compares the application of Intuitionistic Fuzzy AHP and TOPSIS methods. These methods are used to evaluate and rank green suppliers based on ten criteria across three dimensions: supplier performance, environmental protection, and supplier risk. The methods are applied in a case study involving a paper mill company, and the results are compared and interpreted. Alavi et al.[19] propose a dynamic decision support system (DSS) for sustainable supplier selection in circular supply chains, integrating economic, social, and circular criteria using the fuzzy best-worst method (BWM) and fuzzy inference system (FIS). Machine learning is applied to maintain criteria scores. A case study at a petrochemical holding company validates the approach. The research conducted by Robbi Rahim et al.[20] discusses the selection of the best employees, which is typically done manually by top management, making it a long and complicated process. Their study proposes a decision support system using the TOPSIS method to assist in making faster, more objective choices based on criteria such as job responsibilities, work discipline, work quality, and behavior. The final global priority value helps top management in decision-making. The research conducted by Memari et al.[21] introduces an intuitionistic fuzzy TOPSIS method for accurately ranking sustainable suppliers, addressing nine criteria and thirty sub-criteria for an automotive parts manufacturer. Validation is performed through a real-world case study, providing a reliable solution for sustainable sourcing decisions. The research by Joko Purnomo et al.[22] focused on improving the ranking of higher education institutions in the Regional II Palembang area, which

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previously relied on single criteria, causing unbalanced evaluations. They used the fuzzy c-means algorithm to categorize 100 universities based on instructor and student numbers. The TOPSIS algorithm then ranked these institutions, considering factors like lecturer positions, accreditation, certified lecturers, and database report percentages. Seven top colleges were identified, with the highest-scoring institution achieving 0.850. The research by Untung Rahardja et al.[23] focused on developing a Decision Support System (DSS) using the TOPSIS method to select reward recipients at a university. The data involved two groups: educational staff (lecturers) and non-educative staff (employees). The criteria for the educational group included tenure, DP3 value, work attendance percentage, teaching attendance percentage, lecturer functional position, research implementation, community service, student questionnaire results, employment status, and sanctions. For the non-educative group, the criteria were tenure, DP3 value, work attendance percentage, employment status, and sanctions. The outcome of this study was an information system program to assist in the decision-making process for selecting reward recipients.

The purpose of this research is to design a decision support system that may assist businesses in delivering better supplier recommendations. This will be accomplished by identifying criteria suited to the business's conditions and requirements. The research is based on sales data from CV. Arthur Citra Media. This line of inquiry uses a data model incorporating the Profile Matching approach and TOPSIS. The Profile Matching method addresses parameters not based on maximum (benefit) or minimum (cost) values, as in the TOPSIS method. Instead, it emphasizes the ideal outcomes that ought to be achieved following the requirements of the decision-maker. When selecting a supplier, it is essential to consider factors such as cost, quality, delivery, product availability, and payment terms. These criteria are processed using the Profile Matching and TOPSIS methods, and the results of each method's calculations are compared. This comparison aims to evaluate whether the approach is more accurate. The researchers are in a hurry to use both approaches since they are trying to find the best accuracy values that are advised to produce choice outcomes based on ranking the finest alternative providers. Because of the findings of this research, the management of the company may find it easier to choose the banner supplier that best meets the requirements of the corporate standards.

II. RESEARCH METHOD

A DSS is a computerized system that helps decision-making processes handle semi-structured problems by utilizing previously collected data and converting it into information, particularly decision suggestions [24]. This is accomplished by utilizing DSS to address problems already in existence. The DSS is not a tool for making decisions; rather, it facilitates decision-making by presenting relevant and processed data more timely and accurately[25]. The System

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Development Life Cycle (SDLC) method is used in developing the application program. SDLC is a method for analyzing and designing systems, which involves a well-developed system through the use of specific cycles of activities by analysts and users [26]. The programming language that has been used for the development of this system is known as PHP, which stands for Hypertext Preprocessor. PHP is an interpreter language that, like C and Perl, has a lot of similarities with other programming languages. It is a programming language that can be used to create websites quickly. The scripting language known as PHP is used to generate dynamic webpages, whether or not they use a database [27]. In addition, this system's design uses the Unified Modelling Language (UML), a visual/graphical language utilized to visualize, specify, construct, and document object-oriented software development systems [28]. MySQL was chosen to serve as the database for constructing this system. MySQL is a database management system that also functions as a server. This functionality allows MySQL to separate the application from the database. It is possible to store the database on a specialized system and gain access to it from other computers using a remote connection [29]. A flowchart is used to illustrate the multiple steps that go into the creation of this system. These steps can also be found individually on the flowchart. A diagram that represents a system's algorithms, workflow, or operations is referred to as a flowchart [30]. Figure 1 and 2 illustrates the experimental protocol that will be used to test the suggested strategy.

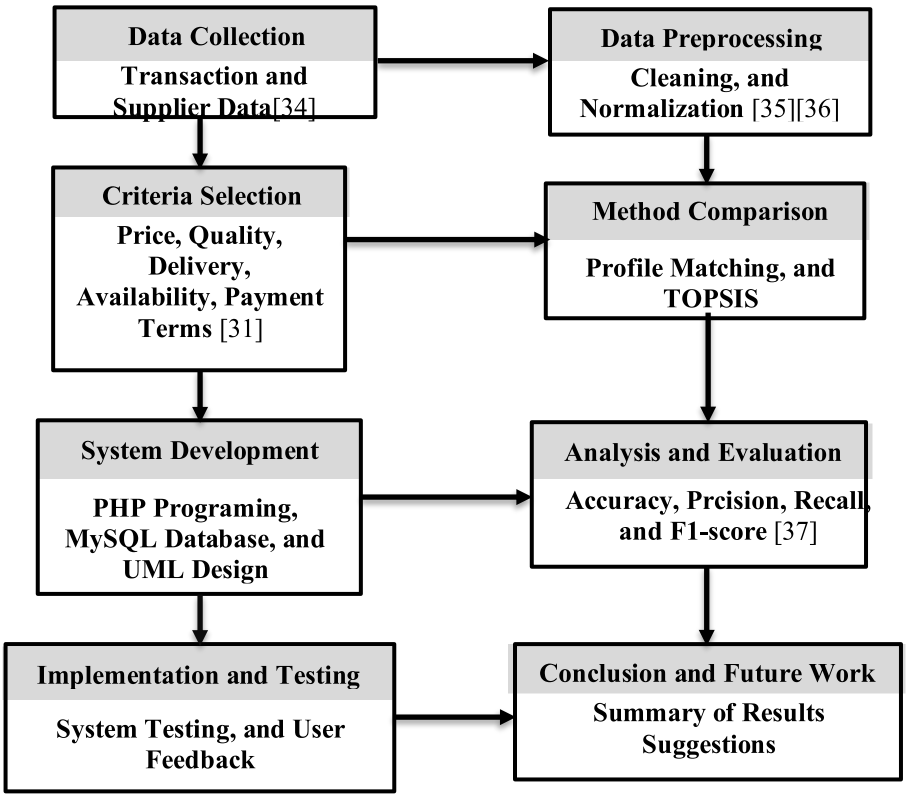

Fig 1. Research Diagram

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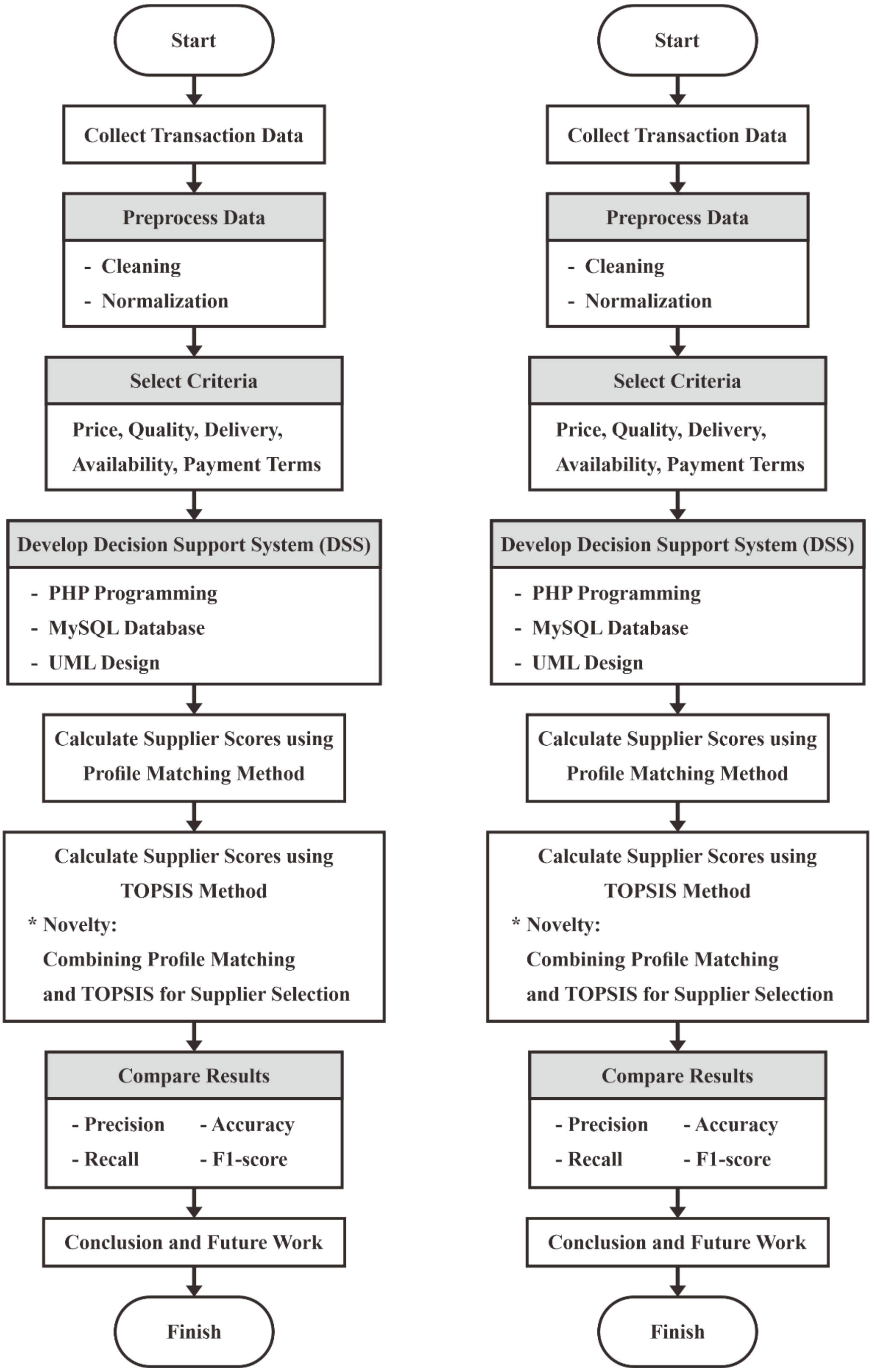

Fig 2. Comparison Flowchart of Profile Matching and TOPSIS Methods

Primary and secondary sources data of information were consulted to carry out this study. In particular, the purchase history of banners from various vendors that the company had previously

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dealt with served as a primary source of information. The pricing (C1), the quality (C2), the delivery (C3), the availability (C4), and the payment conditions (C5) are the factors that are considered.

The profile matching method assumes that the ideal levels of predictor variables that are the focus of the study need to be fulfilled by the participants rather than just minimal levels that need to be attained or surpassed[31]. The Profile Matching method includes comparing the actual data values of a profile and the expected values of the profile to establish the disparities in the level of competency. The weight is increased proportionally to the decrease in the resulting gap [32]. The stages of the profile matching method in this research include:

a) Identifying the criteria: Determine the relevant criteria that will be used to evaluate the profiles. In this case, the criteria are price (C1), quality (C2), delivery (C3), availability (C4), and payment terms (C5).

b) Establishing the ideal profile: Define each criterion's ideal values or levels. These ideal values represent the desired or expected performance for each criterion.

c) Gathering profile data: Collect the actual data for each evaluated profile. This data represents the performance or attributes of each profile under consideration.

d) Calculating the gaps: Compare the actual values of each criterion with the ideal values to calculate the gaps. The gaps indicate the differences or deviations between each criterion's actual and desired performance.

e) Assigning weights to the gaps: It is important to assign weights to the gaps based on how important or urgent they are. The relative significance of each factor in the decision-making process is reflected in the weights assigned to each criterion.

f) Aggregating the weighted gaps: Combine the weighted gaps for each profile to obtain an overall score or rating. Based on the defined criteria, this score represents each profile's competency level or suitability.

g) Decision-making: Use the calculated scores to make informed decisions or recommendations. Profiles with lower gaps and higher scores are considered more favorable or preferred.

TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) is one of the decision-making methods where the selected alternative is not only the closest to the positive ideal solution but also the farthest from the negative ideal solution[33]. The following steps in this research, including:

a) Identifying the criteria and alternatives.

b) Putting a preference weight on each of the criteria to be considered: The preference weights that will be utilized are as follows: extremely unimportant equals 1, unimportant equals 2, moderately important equals 3, important equals 4, and very important equals 5.

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c) The process of building the normalized decision matrix: The effectiveness of each potential solution is calculated with Equation (1).Where *i = 1,2,...,m* and *j = 1,2,...,n*. The normalised matrix elements *[i][j]* are denoted the r_{ij} variable and the decision matrix element *x* is denoted by the x_{ij} variable.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (1)$$

The normalized weight matrix can be used to determine the positive ideal solution. A^+ and negative ideal solution A^- based on the normalized weight ratings (y_{ij}), which can be calculated using Equation(2).Where i=1,2,..m; and j=1,2,..n; the y_{ij} variable is a normalized matrix of elements *[i][j]*, and = decision matrix element *x*.

d) Finding the positive optimum solution can be accomplished by utilizing the normalized weight matrix. The perfect answer is a plus sign and a negative. A based on the normalized weight ratings, which are denoted by the notation y_{ij}, and may be computed with the help of Equation (2). Where i can range from 1 to m and *j* can range from 1 to n, the y_{ij} variable is a normalized matrix with the elements *[i][j]*, and x_i is the element *x* variable of the decision matrix.

$$y_{ij} = w_i r_{ij} \quad (2)$$

e) Equation 3 represents the positive ideal solution matrix, and Equation 4 represents the negative ideal solution matrix.

$$A^+ = y_1^+, y_2^+, \dots, y_n^+ \quad (3)$$

$$A^- = y_1^-, y_2^-, \dots, y_n^- \quad (4)$$

Where,
$$y_j^+ = \begin{cases} max_i y_{ij};\ if\ j\ is\ profit\ attribute \\ min_i y_{ij};\ if\ j\ is\ cost\ attribute \end{cases}$$

$$y_j^- = \begin{cases} min_i y_{ij};\ if\ j\ is\ profit\ attribute \\ max_i y_{ij};\ if\ j\ is\ cost\ attribute \end{cases}$$

f) Determine the distance that each potential decision alternative resides from the optimal positive and negative solutions. Equation (5) can be used to determine the distance that separates the alternative D_i Positive ideal solution from the solution.The difference in distance between the alternative D_i. By utilizing Equation (6), one can determine the value of the negative ideal solution.

$$D_i^+ = \sqrt{\sum_{j=1}^{n} (y_i^+ - y_{ij})^2};\ i = 1,2,\dots,m \quad (5)$$

$$D_i^- = \sqrt{\sum_{j=1}^{n} (y_{ij} - y_i^-)^2};\ i = 1,2,\dots,m \quad (6)$$

Where the D_i^+ variable represents the alternative distance to-i with the positive ideal solution, the y_i^+ variable represents the elements of a positive ideal solution *[i]*, the y_{ij} variable represents the elements of normalized weighted matrices *[i][j]*, the D_i^- variable represents the alternative

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distance to-i with the negative ideal solution and the y_i^- variable represents the elements of a negative ideal solution *[i]*.

g) Determining the weight that should be given to each alternative preference. By applying Equation (7), one can determine the preference value for each choice, which is denoted by V_i.Where the V_i variable represents the proximity of each alternative to the ideal solution; the D_i^+ variable represents the alternative's distance to-i when it is associated with a positive ideal solution and the D_i^- variable represents the alternative's distance to-i when it is associated with a negative ideal solution and where a larger V_i value indicates that the alternative to-i is preferred.

$$V_i = \frac{D_i^-}{D_i^- + D_i^+}; i = 1,2,\ldots,m \quad (7)$$

III. RESULT AND DISCUSSION

This study ranks providers using Profile Matching and TOPSIS. A dataset of the last six months' vendor banner material purchases will be used to compare profile matching and TOPSIS findings. After that, the accuracy of the results generated from each approach is compared with the actual data from the company to determine which method yielded the most accurate findings. Identifying the most suitable provider is made possible by calculating the Profile Matching and TOPSIS values. The findings of this research are that the TOPSIS method provides more accurate and objective results in selecting the best banner supplier. The results of this research are in line with or supported by previous studies, such as Jadidi et al. (2015), which demonstrated the effectiveness of the TOPSIS method in supplier selection, and Balioti et al. (2018), who highlighted the robustness of TOPSIS in multi-criteria decision-making scenarios. The following is a rundown of the outcomes of the calculations performed using the TOPSIS method:

Step 1: Find out what the criteria are. It is necessary to determine their type and whether they fall into the category of benefits or costs. In Table 1, "cost" refers to criteria where a smaller value benefits the company. In comparison, "benefit" refers to criteria where a more significant value benefits the company.

Table 1. Types of Criteria

Criteria Code	Criteria Name	Type
C01	Price	Cost
C02	Quality	Benefit
C03	Delivery	Cost
C04	Availability	Benefit
C05	Payment Terms	Benefit

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Step 2: Determining preference weights for each criterion. The weights range from 1 to 5, where a smaller number indicates less importance and a larger one indicates greater importance. For further clarification, please refer to Table 2.

Table 2. Weight of Criteria

Criteria Code	Criteria Name	Weight
C01	Price	5
C02	Quality	5
C03	Delivery	4
C04	Availability	4
C05	Payment Terms	4

Step 3: Decision matrix normalized. The divider values are determined for simplicity before generating the normalized decision matrix. The calculation can refer to Equation (1). For example, refer to Figure 5, which shows the alternative values. Calculate the divider value for C1 according to Equation (1). *Divider Value C1* = $\sqrt{2^2 + 2^2 + 3^2 + 3^2 + 3^2 + 3^2}$ = *6.633.* Similarly, to calculate the divider value for C2 and onwards, the steps are the same as the Equation mentioned above. After obtaining the divider values, each alternative value will be divided by the corresponding divider value. The calculation also refers to Equation (1). For example, calculations are taken from the *AleaGrafika supplier*. For the program results, please refer to Table 3.

$$Normalized\ matrix = \frac{2}{6.633} = 0.302$$

Table 3. Normalized Matrix Values

Supplier Name	Criterias				
	C1	***C2***	***C3***	***C4***	***C5***
Alea Grafika	0.302	0.504	0.462	0.436	0.567
Cello	0.302	0.504	0.462	0.436	0.567
Colourlink	0.452	0.378	0.346	0.218	0.189
Mandiri Jaya	0.452	0.252	0.462	0.436	0.378
Pimex	0.452	0.378	0.346	0.436	0.189
Wujud Unggul	0.452	0.378	0.346	0.436	0.378

Step 4: Finding Weighted Normalised Matrix. Calculate the weighted normalized matrix using equation 2. See Figure 3 for weights—example: AleaGrafika supplier weighted matrix. Table 4 shows some alternate calculations. *Weighted matrix = 0.302 x 5 = 1.508.*

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Table 4. Normalized Weight Values

Supplier Name	Criterias				
	C1	*C2*	*C3*	*C4*	*C5*
Alea Grafika	1.508	2.52	1.848	1.746	2.268
Cello	1.508	2.52	1.848	1.746	2.268
Colourlink	2.261	1.89	1.386	0.873	0.756
Mandiri Jaya	2.261	1.26	1.848	1.746	1.512
Pimex	2.261	1.89	1.386	1.746	0.756
Wujud Unggul	2.261	1.89	1.386	1.746	1.512

Step 5:Find the Positive and Negative Ideal Solution Matrix. Equations 3 and 4 determine positive and negative ideal solution values. The positive ideal solution is obtained from the smallest weighted matrix values for costs and the greatest for benefits. The weighted matrix with the highest cost values and the lowest benefit values yields the negative optimum solution. See Table 5 and 6 for clarity.

Table 5. Positive Ideal Matrix *(A^+)*

Criterias				
price	*Quality*	*Delivery*	*Availability*	*Payment term*
$Y1^+$	$Y2^+$	$Y3^+$	$Y4^+$	$Y5^+$
1.5076	2.5198	1.3856	1.7457	2.2678

Table 6. Negative Ideal Matrix (A^-)

Criterias				
price	*Quality*	*Delivery*	*Availability*	*Payment term*
$Y1^-$	$Y2^-$	$Y3^-$	$Y4^-$	$Y5^-$
2.2613	1.2599	1.8475	0.8729	0.7559

Step 6: Use equations (5) and (6) to calculate the distance between each alternative and the positive (*D+*) and negative (*D-*)) ideal matrices. Calculate D+ and D- for the AleaGrafika supplier.

$$D^+ = \sqrt{\begin{matrix}(1.508-1.508)^2+(2.520-2.520)^2+(1.386-1.848)^2+\\(1.746-1.746)^2+\ (2.268-2.268)^2\end{matrix}} = 0.462$$

$$D^- = \sqrt{\begin{matrix}(2.261-1.508)^2+(1.260-2.520)^2+(1.848-1.848)^2+\\(0.873-1.746)^2+\ (0.756-2.268)^2\end{matrix}} =2.281$$

The process remains identical to the one outlined earlier for calculating the gap between alternative values and the positive and negative ideal solution matrices shown in Table 7 and 8.

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Table 7. Distance to Positive Ideal Solution

Supplier Names	D^+
Alea Grafika	0.4619
Cello	0.4619
Colourlink	2.0031
Mandiri Jaya	1.7147
Pimex	1.803
Wujud Unggul	1.2395

Table 8. Distance to Negative Ideal Solution

Supplier Names	*D-*
Alea Grafika	2.281
Cello	2.281
Colourlink	0.7811
Mandiri Jaya	1.1547
Pimex	1.1713
Wujud Unggul	1.3941

Step 7: The preference value for each alternative (V_i) can be determined using equation 7. Compute the preference value for the supplier Alea Grafika. Table 9 and 10 illustrates that this page is the final data display, allowing users to view the comparison outcomes generated by the Profile Matching and TOPSIS methods.

$$V_i = \frac{2.281}{2.281 + 0.462} = 0.8316$$

Table 9. TOPSIS Final Result Decision

Rank	Supplier Names	Total
1	*Alea Grafika*	0.8316
2	*Cello*	0.8316
3	*Wujud Unggul*	0.5294
4	*Mandiri Jaya*	0.4024
5	*Pimex*	0.3938
6	*Colourlink*	0.2805

Table 10. Profile Matching Final Result Decision

Rank	Supplier Names	Total
1	*Alea Grafika*	4.1
2	*Cello*	4.1
3	*Wujud Unggul*	4
4	*Pimex*	3.8
5	*Mandiri Jaya*	3.7
6	*Colourlink*	3.6

Accuracy values are obtained through testing using a confusion matrix. This evaluation incorporates data from six different months, and the system's recommendations are deemed accurate when they align with real-world data. Table 11 displays the testing outcomes for the TOPSIS and Profile Matching methods utilizing the Confusion Matrix. Table 12 presents the results of the TOPSIS method testing based on the confusion matrix analysis.

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Table 11. Data Testing for TOPSIS and Profile Matching

Test Data	Predicted Data	Actual Data	Topsis Method	Profile Matching Method
July	*Cello*	*Cello*	True Positive	False Negative
August	*AleaGrafika*	*AleaGrafika*	True Positive	True Positive
September	*AleaGrafika*	*AleaGrafika*	True Positive	True Positive
October	*Cello*	*Cello*	True Positive	True Positive
November	*AleaGrafika*	*Mandiri Jaya*	False Negative	False Negative
December	*AleaGrafika*	*AleaGrafika*	True Positive	True Positive

Table 12. Confusion Matrix for TOPSIS Method

X		**Actual value**	
		True	***False***
Prediction value	Positive	5	0
	Negative	0	1

Accuracy = $\frac{TP+TN}{TP+TN+FP+FN} = \frac{5+0}{5+0+0+1} = \frac{5}{6}$ = 0.84 = 0.84 x 100% = 84 %

Precision = $\frac{TP}{TP+FP} = \frac{5}{5+0}$ = 1 = 1 x 100% = 100 %

Recall = $\frac{TP}{TP+FN} = \frac{5}{5+1} = \frac{5}{6}$ = 0.84 = 0.84 x 100% = 84 %

F1 Score = 2 * (84% * 100%) / (84% + 100%) = 92%

The test results in Table 12 using the Confusion Matrix for the TOPSIS method show a precision value of 100%, indicating perfect accuracy in matching user requests with the system-generated answers. The recall value is 84%, indicating a high success rate in retrieving relevant information. The accuracy value is also 84%, indicating a good agreement between the system testing and the actual values. When these values are combined, the F1 score is calculated to be 92%. Based on the test results, the confusion matrix was used in the Profile Matching method in Table 13.

Table 13. Confusion Matrix for Profile Matching Method

X		**Actual value**	
		True	***False***
Prediction value	Positive	4	0
	Negative	0	2

Accuracy = $\frac{TP+TN}{TP+TN+FP+FN} = \frac{4+0}{4+0+0+2} = \frac{4}{6}$ = 0.67 = 0.67 x 100% = 67 %

Precision = $\frac{TP}{TP+FP} = \frac{4}{4+0}$ = 1 = 1 x 100% = 100 %

Recall = $\frac{TP}{TP+FN} = \frac{4}{4+2} = \frac{4}{6}$ = 0.67 = 0.67 x 100% = 67 %

F1 Score = 2 * (67% * 100%) / (67% + 100%) = 81%

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The test results in Table 2 using the Confusion Matrix for the Profile Matching method show a precision value of 100%, indicating a perfect accuracy in matching user requests with the system-generated answers. The recall value is 67%, indicating a high success rate in retrieving relevant information. The accuracy value is also 67%, indicating a good agreement between the system testing and the actual values. When these values are combined, the F1 score is calculated to be 81%. Additionally, future development of the decision support system for supplier selection can consider other criteria and focus on enhancing the system by providing online document upload facilities.

IV. CONCLUSION

The design and testing outcomes can be inferred that the created system can aid company management in selecting the optimal supplier for banners, considering their offerings and services. The test results indicate that the decision support system employing the TOPSIS method demonstrated precision of 100%, recall of 84%, accuracy of 84%, and an F1-score of 92%. In comparison, the Profile Matching method exhibited a precision of 100%, recall of 67%, accuracy of 67%, and an F1-score of 81%. Therefore, based on the dataset and the comparison between the TOPSIS and Profile Matching methods, it can be concluded that the method is suitable for selecting the best supplier for CV. Arthur Citra Media is the TOPSIS method, which achieved a precision of 100%, recall of 84%, accuracy of 84%, and F1-score of 92%. A simple application program was used for the system's design. The findings of this research underscore the effectiveness of the TOPSIS method in supplier selection for digital printing companies, particularly for CV. Arthur Citra Media. Future research should focus on further development to enhance the application program, incorporating more dynamic criteria and expanding the dataset to include longer time periods and a more diverse range of suppliers. Additionally, exploring the integration of other advanced decision-making methods and machine learning algorithms could provide deeper insights and more robust decision support.

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