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Applying TOPSIS to selecting business accounting software: A case study at Truong Son Technology Development Investment Joint Stock Company

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ABSTRACT

This study aimed to build a model and set of criteria to evaluate and select business accounting software providers for Truong Son Technology Investment and Development Joint Stock Company. The study helped choose the most suitable supplier that meets the criteria that the company desired. The research proposed the Technique of Order Preference Similarity to the Ideal Solution (TOPSIS) model and was also applied in the case of selecting accounting software suppliers for Truong Son Technology Investment and Development Joint Stock Company. There were 5 business accounting software packages considered: Misa business accounting software, Bravo accounting software, FAST Accounting software, Effect accounting software, and Gamma accounting software. The ranking results of accounting software providers at Truong Son Technology Investment and Development Joint Stock Company were as follows: A1 (Misa Business Accounting Software) was the best supplier, second-ranking was A3 (FAST Accounting software), followed by A2 (Bravo Accounting Software) in third place. The findings of this study could be used as a valuable reference for businesses to choose the best supplier.

1. Introduction

Stepping into the industrial era 4.0, applying technology in production activities and operation management has been trending in businesses. Now, there are up to 90% of businesses in Vietnam using accounting software in finance and accounting work. Accounting software is an application built to effectively support accounting staff and fully integrates financial and accounting professional functions, solving matters of revenue, expenditure, book management, accounting, salary payment, debt payment, etc. On the other hand, accounting software optimally supports the preparation of financial reports, and updating details of corporate financial health. Currently, on the market, many accounting software can handle all the accounting operations from basic to advanced, suitable for all types of businesses. However, to select the most suitable accounting software, businesses need to consider and carefully investigate a reputable provider. In the current context, there are many business accounting software providers, making it quite difficult for entrepreneurs to decide which provider to choose with what criteria. There have been several studies that have proposed different methods such as non-parametric models (DEA) (Charnes et al., 1978), and multi-criteria-decision-making models (MCDM) to evaluate and select suppliers.

In particular, the multi-criteria-decision-making model includes mainly: the analytical hierarchical method (AHP) (Saaty, 2008), analytical network process (ANP) (Saaty & Vargas, 2006), and the Technique of Order Preference Similarity to the Ideal Solution (TOPSIS) (Hwang & Yoon, 1981). However, the number of studies in Vietnam related to building evaluation

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and selection models for suppliers in general and accounting software providers for businesses is quite limited. Therefore, the purpose of this study is to apply the TOPSIS method to select an accounting software supplier for Truong Son Technology Investment and Development Joint Stock Company. The potential accounting software consideration in the selection includes

(1) Misa business accounting software: this is one of the leading accounting software chosen by many businesses with outstanding features such as: automatically input sales documents from electronic invoices from many different suppliers; alerts on the business's operating status (active, inactive, etc.) automatically to avoid document legal risks; connect with the bank, can automatically transfer money, check outstanding balances, transaction history, get supplementary books or take charge right on the accounting software; provide full information on legal documents related to the field of accounting and tax; automatically update and adjust information when there are changes; online tax declaration; perform accounting operations like treasury, deposits, salaries, taxes, debts, tools, fixed assets, supplies and goods, purchases, invoices, sales, generalization, etc.

(2) Bravo accounting software: this is software that monitors and balances financial capacity, production, and business in enterprises; supports in controlling the business and financial situation of the enterprise; updates foreign currency exchange rates regularly to minimize costs arising from foreign currency differences; Find and self-correct data errors; Allows linking of digital data, etc.

(3) FAST Accounting software: suitable for small and medium-sized businesses. The software not only fully meets common accounting operations but also provides a diverse management reporting system such as analyzing data over time and in many different dimensions, thoroughly solving pricing problems. become complicated.

(4) Effect accounting software: designed to meet the accounting and financial management needs of businesses in Vietnam. Effect offers a range of features to help businesses manage their accounting activities easily and effectively. This software allows users to perform daily accounting tasks such as data entry, report generation, and financial planning. Besides, Effect offers multi-bank support, allowing users to manage their accounts from many different banks on the same interface.

(5) Gama accounting software: includes many features of cash and cash equivalents accounting, sales accounting, general accounting, warehouse accounting, accounting liabilities, and fixed asset accounting; and features user access control, identity authentication, and data encryption; In addition, Gama supports integration with other systems such as POS and CRM, etc.

2. Literature review

Khan et al. (2024) believed that thanks to the innovative advancements of IoT, the educational environment in schools has transformed from a traditional learning system to a digital education system. Therefore, choosing a smart and safe educational facility also causes difficulties for researchers. The study applied the Entropy technique to measure the significance of each criterion and TOPSIS was applied to rank ten school systems to tackle the challenge of selecting smart and safe school systems based on Iodine. Based on the evaluation results, a smart and safe school system is selected.

Tham et al. (2019) proposed using the Fuzzy-TOPSIS integrated model to evaluate and rank suppliers. The model allows the simultaneous use of many criteria, such as cost, transportation, quality, responsiveness, infrastructure, attitude, discount policy, product origin, management system environment, etc. to evaluate suppliers at Thanh Phu Plastic Packaging Co., Ltd. The ranking results help the Company select suitable suppliers to improve business performance as well as supply chain efficiency.

Bui et al. (2017) proposed a new integrated decision-making model for green supplier selection and clustering. The proposed model combines the AHP to determine weights and the ideal point method (TOPSIS) to rank and group potential green suppliers. The proposed model allows the proportional values of options and the weights of evaluation criteria to be represented as linguistic variables.

Do et al. (2024) suggested a method using AHP and fuzzy ordering techniques similarly to the TOPSIS solution to evaluate and rank lecturer performance. Fuzzy AHP is used to calculate the weights of sub-criteria and criteria in the hierarchical evaluation framework, while fuzzy TOPSIS is used to rank the lecturers. The weights obtained from the fuzzy AHP were integrated into the fuzzy TOPSIS calculations to determine the preferred solutions. Initially, pairwise comparisons are conducted and fuzzy AHP is applied to determine the significance weight of the evaluation index system. Then, fuzzy TOPSIS is used in the second stage to determine the rankings of faculty members' performance. Using a faculty evaluation framework not only evaluates a faculty member's overall competency but also considers their performance to each specific attribute being evaluated. This allows instructors to identify areas for improvement.

Ngo Thi Minh Thu (2023) aims specifically at developing a stochastic multidimensional decision-making approach to solve the warehouse location problem in a stochastic environment with uncertain conditions. In the developed approach, implementation of the fuzzy sets analysis process method according to the Fuzzy-TOPSIS model is used to determine the relative importance of the criteria. This study addresses the solution of choosing the optimal warehouse location for a logistics company in Da Nang City. Thanks to its rigor and relevance to reality, this method not only supports warehouse location decisions but also contributes to improving the sustainability of supply chain management, and corporate logistics services.

Gupta et al. (2018) proposed a method to identify the most suitable locations for establishing electric vehicle charging stations among available locations. To facilitate this determination, various factors related to costs, road dynamics, regional electricity dynamics, etc. have been considered. This project was undertaken due to the need for a well-planned network of stations across the region to facilitate easy and convenient charging of electric vehicles in the near future.

Singh et al. (2020) developed a method to strategically rank store locations using criteria such as demographic characteristics, economic criteria, competition, accessibility, consumer reach, store size, total costs, site appeal, and security. 24-hour convenience stores in the Indian capital were reviewed to study and identify the key criteria that influence the performance of a convenience store. The fuzzy AHP method is used to find the weight for each criterion and the combination of fuzzy TOPSIS and relational analysis is applied to rank the alternatives using these criteria weights. The research results become a useful resource for diverse retailers looking to expand and become profitable.

3. Research method

The TOPSIS method is one of the methods of the MCDM model. This model is based on fuzzy set theory to solve complex selection problems including many criteria with many choices. According to (Zadeh, 1965) fuzzy set theory is an effective tool to quantify vague and unclear information which we can apply to real problems when making decisions with many criteria. The MCDM method will quantify these standards, calculate the total score of the evaluation participants according to the weight of each standard, and help decision-makers have a more solid and accurate basis. Globally, there have been many studies on MCDM applications with methods such as TOPSIS, AHP, DEA, ANP, etc. TOPSIS method proposed by (Hwang & Yoon, 1981) is a popular tool for solving MCDM multi-criteria decision-making problems. The main content of the TOPSIS method is evaluating options by simultaneously measuring the distance from the options to the positive optimal solution (PIS) and the negative optimal solution (NIS). The selected option must have the shortest distance from PIS and the furthest distance from NIS. However, there are many decision-making situations with uncertain information, causing decision-makers to become hesitant or unable to assign clear values to their judgments (Chan & Kumar, 2007). Then, decision-makers are often more interested in judgments on a range than in specifying clear values for those judgments. (Amiri, 2010).

The TOPSIS method is built based on weights. This weight is based on probability theory to evaluate the probability of an event occurring. This limits the subjective effects that other methods encounter, for example, the Delphi method and AHP hierarchical analysis. Input data for the model is collected through surveys with objects such as company leaders and department leaders of Truong Son Technology Investment and Development Joint Stock Company.

4. Research result

Step 1: Identify a set of standards for evaluating business accounting software providers

Suppose a decision-making committee consists of l decision maker (D_t, $t = 1,...,l$) responsible for evaluating m (A_i, $i = 1,...,n$) accounting software suppliers based on n criteria (C_j, $j = 1,...,m$), In which, the evaluation rate of accounting software providers is based on each standard and the weights of the standards are represented as linguistic variables and presented as a triangular fuzzy number.

The data used in this study is based on in-depth interviews with company leaders, and department managers at Truong Son Technology Investment and Development Joint Stock Company. The decision-making panel includes 5 experts. Using standards from the document review combined with the unit's practical situation, the experts discussed and selected 6 criteria to evaluate business accounting software providers including: *Price (C1), Quality (C2), Technology (C3), Customer care service (C4), Reputation (C5), Reliability (C6).* The business accounting software included in the selection are A1: Misa business accounting software, A2: Bravo accounting software, A3: FAST Accounting software, A4: Effect accounting software, and A5: Gama accounting software.

Step 2: Identify the weight of each criterion

To determine the weight of each criterion, the linguistic variables and the weight of the criteria are both expressed as triangular fuzzy numbers:

Table 1
Fuzzy TOPSIS linguistic scale

Weight		
Linguistic terms	Abbreviation	Triangular fuzzy number
Very unimportant	VU	(0.1, 0.2, 0.3)
Unimportant	U	(0.2, 0.3, 0.4)
Normal	N	(0.3, 0.5, 0.7)
Important	I	(0.5, 0.7, 0.9)
Very important	VI	(0.8, 0.9, 1.0)

After determining a set of supplier criteria, each individual in the panel makes a decision (D_1, D_2, D_3, D_4, D_5) to determine the importance level of the criteria through the use of linguistic terms as shown in Table 1.

Step 3: Calculate the average proportion value of each criterion

Assume a group of users U_t with t = 1, 2, …, k evaluate m options A_i with *i* = 1, …, m respects h evaluation criteria C_j, j = 1, 2, …, h.

Put $x_{ijt} = (e_{ijt}, f_{ijt}, g_{ijt})$ with *i* = 1,… *m*, *j* = 1,…, *h* and *t* = 1,…, *k* are the values for each option A_i with the group of users U_t and criteria C_j. The average value $x_{ij} = (e_{ij}, f_{ij}, g_{ij})$ was calculated as following:

$$x_{ij} = \frac{1}{k} \times (x_{ij1} + x_{ij2} + ... + x_{ijt} + ... + x_{ijk}) \tag{1}$$

In which, $e_{ij} = \frac{1}{k}\sum_{t=1}^{k} e_{ijt}$, $f_{ij} = \frac{1}{k}\sum_{t=1}^{k} f_{ijt}$, and $g_{ij} = \frac{1}{k}\sum_{t=1}^{k} g_{ijt}$

In this step, the decision-making panel will evaluate each accounting software (*A1, A2, A3, A4, A5*) based on the selected selection criteria. Proportion value and average value of 5 accounting software per criterion evaluated by the decision-making panel. According to the Eq. (1) we have:

Table 2
Normalized weight of each criterion

Criteria		D1	D2	D3	D4	D5	Aggregated fuzzy number
C1 Price	A1	G	G	VG	G	G	(0.720, 0.820, 0.920)
	A2	VG	VG	G	G	VG	(0.760, 0.860, 0.960)
	A3	G	VG	G	G	A	(0.660, 0.780, 0.900)
	A4	VG	G	VG	VG	G	(0.760, 0.860, 0.960)
	A5	A	G	G	G	VG	(0.660, 0.780, 0.900)
C2 Quality	A1	VG	VG	VG	VG	G	(0.780, 0.880, 0.980)
	A2	G	G	A	A	G	(0.580, 0.720, 0.860)
	A3	VG	VG	G	G	VG	(0.760, 0.860, 0.960)
	A4	A	G	G	VG	G	(0.660, 0.780, 0.900)
	A5	G	G	G	VG	G	(0.720, 0.820, 0.920)
C3 *Technology*	A1	VG	VG	VG	G	VG	(0.780, 0.880, 0.980)
	A2	G	G	G	VG	G	(0.720, 0.820, 0.920)
	A3	G	G	VG	VG	VG	(0.760, 0.860, 0.960)
	A4	A	G	G	G	VG	(0.660, 0.780, 0.900)
	A5	VG	G	G	G	G	(0.720, 0.820, 0.920)
C4 Customer care service	A1	VG	VG	G	G	VG	(0.760, 0.860, 0.960)
	A2	G	G	G	VG	G	(0.720, 0.820, 0.920)
	A3	VG	G	VG	G	G	(0.740, 0.840, 0.940)
	A4	G	G	A	G	G	(0.640, 0.760, 0.880)
	A5	G	VG	VG	G	G	(0.740, 0.840, 0.940)
C5 Reputation	A1	VG	VG	VG	VG	VG	(0.800, 0.900, 1.000)
	A2	VG	G	G	VG	G	(0.740, 0.840, 0.940)
	A3	VG	VG	VG	G	G	(0.760, 0.860, 0.960)
	A4	G	A	G	G	G	(0.640, 0.760, 0.880)
	A5	VG	G	G	VG	G	(0.740, 0.840, 0.940)
C6 Reliability	A1	VG	G	VG	VG	VG	(0.780, 0.880, 0.980)
	A2	G	G	VG	G	G	(0.720, 0.820, 0.920)
	A3	G	VG	VG	G	G	(0.740, 0.840, 0.940)
	A4	G	G	A	G	G	(0.640, 0.760, 0.880)
	A5	G	A	G	G	G	(0.640, 0.760, 0.880)

Source: research result

Step 4: Calculate average weight

Put $w_{jt} = (o_{jt}, p_{jt}, q_{jt})$, $w_{jt} \in R^*$, $j = 1,...,h,$ $t = 1,...,k$ is the importance level determined by the user group U_t with criteria C_j. The average weight $w_j = (o_j, p_j, q_j)$ of the criteria C_j evaluated by *k* user groups was calculated as following:

$$w_j = \frac{1}{k} \times (w_{j1} + w_{j2} + ... + w_{jk}) \tag{2}$$

In which, $o_j = \frac{1}{k}\sum_{t=1}^{k} o_{it}, p_j = \frac{1}{k}\sum_{t=1}^{k} p_{jt}, q_j = \frac{1}{k}\sum_{t=1}^{k} q_{jt}.$

According to Eq. (2), we have:

Table 3
Weights and average weight of the criteria

Criteria	Decision-makers panel					W_{ij}
	D_1	D_2	D_3	D_4	D_5	
C1	VI	VI	VI	I	VI	(0.740, 0.860, 0.980)
C2	I	VI	VI	I	VI	(0.680, 0.820, 0.960)
C3	I	VI	VI	VI	VI	(0.740, 0.860, 0.980)
C4	VI	VI	VI	I	I	(0.680, 0.820, 0.960)
C5	I	VI	I	VI	I	(0.620, 0.780, 0.940)
C6	VI	VI	I	VI	I	(0.680, 0.820, 0.960)

Source: The model analysis

Step 5: Normalize the expression of options with objective criteria

The criteria were divided into benefit criteria (B) and cost criteria (C). The benefit criterion has the nature of "as much as possible", cost criteria have the nature of "The less the better". So, to ensure compatibility between the average rating and the average importance, the average rating must be normalized into a comparable range. Assume that $r_{ij} = (a_{ij}, b_{ij}, c_{ij})$ is the expression of option *i* based on criteria *j*. Value x_{ij} then would be calculated as the following:

$$x_{ij} = (\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}), j \in B$$

$$x_{ij} = (\frac{\overline{a}_j}{c_{ij}}, \frac{\overline{a}_j}{b_{ij}}, \frac{\overline{a}_j}{a_{ij}}), j \in C$$

With $\overline{a}_j = \min_i a_{ij}, c_j^* = \max_i c_{ij}, i = 1,...,m, j = 1,...,n.$

Table 4
Normalized decision matrix

		D1			D2			D3			D4			D5		
C1	A1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
	A2	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1
	A3	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.4	0.6	0.8
	A4	0.8	0.9	1	0.7	0.8	0.9	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9
	A5	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1
C2	A1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9
	A2	0.7	0.8	0.9	0.7	0.8	0.9	0.4	0.6	0.8	0.4	0.6	0.8	0.7	0.8	0.9
	A3	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1
	A4	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
	A5	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
C3	A1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.8	0.9	1
	A2	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
	A3	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1
	A4	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1
	A5	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9
C4	A1	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1
	A2	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
	A3	0.8	0.9	1	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
	A4	0.7	0.8	0.9	0.7	0.8	0.9	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9
	A5	0.7	0.8	0.9	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
C5	A1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1
	A2	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
	A3	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
	A4	0.7	0.8	0.9	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9
	A5	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9
C6	A1	0.8	0.9	1	0.7	0.8	0.9	0.8	0.9	1	0.8	0.9	1	0.8	0.9	1
	A2	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
	A3	0.7	0.8	0.9	0.8	0.9	1	0.8	0.9	1	0.7	0.8	0.9	0.7	0.8	0.9
	A4	0.7	0.8	0.9	0.7	0.8	0.9	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9
	A5	0.7	0.8	0.9	0.4	0.6	0.8	0.7	0.8	0.9	0.7	0.8	0.9	0.7	0.8	0.9

Source: Model analysis result

Step 6: Determination of the weighted normalized decision matrix

The weight of the normalized decision matrix G, is calculated by multiplying each normalized criteria x_{ij} with weight w_{jt}.

$$G_j = x_{ij} \times w_j, i = 1,...,m, j = 1,...,n \tag{3}$$

As the Eq. (3) we have the following table:

Table 5
Average evaluation of suppliers based on each criterion

Criteria		D1	D2	D3	D4	D5	R_{ij}		
C1 ***Price***	A1	G	G	VG	G	G	0.5328	0.7052	0.9016
	A2	VG	VG	G	G	VG	0.5624	0.7396	0.9408
	A3	G	VG	G	G	A	0.4884	0.6708	0.882
	A4	VG	G	VG	VG	G	0.5624	0.7396	0.9408
	A5	A	G	G	G	VG	0.4884	0.6708	0.882
C2 ***QualiGy***	A1	VG	VG	VG	VG	G	0.5304	0.7216	0.9408
	A2	G	G	A	A	G	0.3944	0.5904	0.8256
	A3	VG	VG	G	G	VG	0.5168	0.7052	0.9216
	A4	A	G	G	VG	G	0.4488	0.6396	0.864
	A5	G	G	G	VG	G	0.4896	0.6724	0.8832
C3 ***Technology***	A1	VG	VG	VG	G	VG	0.5772	0.7568	0.9604
	A2	G	G	G	VG	G	0.5328	0.7052	0.9016
	A3	G	G	VG	VG	VG	0.5624	0.7396	0.9408
	A4	A	G	G	G	VG	0.4884	0.6708	0.882
	A5	VG	G	G	G	G	0.5328	0.7052	0.9016
C4 ***Customer care service***	A1	VG	VG	G	G	VG	0.5168	0.7052	0.9216
	A2	G	G	G	VG	G	0.4896	0.6724	0.8832
	A3	VG	G	VG	G	G	0.5032	0.6888	0.9024
	A4	G	G	A	G	G	0.4352	0.6232	0.8448
	A5	G	VG	VG	G	G	0.5032	0.6888	0.9024
C5 ***Reputation***	A1	VG	VG	VG	VG	VG	0.496	0.702	0.94
	A2	VG	G	G	VG	G	0.4588	0.6552	0.8836
	A3	VG	VG	VG	G	G	0.4712	0.6708	0.9024
	A4	G	A	G	G	G	0.3968	0.5928	0.8272
	A5	VG	G	G	VG	G	0.4588	0.6552	0.8836
C6 ***Reliability***	A1	VG	G	VG	VG	VG	0.5304	0.7216	0.9408
	A2	G	G	VG	G	G	0.4896	0.6724	0.8832
	A3	G	VG	VG	G	G	0.5032	0.6888	0.9024
	A4	G	G	A	G	G	0.4352	0.6232	0.8448
	A5	G	A	G	G	G	0.4352	0.6232	0.8448

Source: Model analysis result

Step 7: Calculate A^+, A^-, d_i^+, d_i^-.

Fuzzy positive ideal solution- (FPIS, A^+) and Fuzzy negative ideal solution (FNIS, A^-) were calculated as follows

$$A^+ = (1;1;1)$$
$$A^- = (O;O;O)$$

The distance from each option $A_i, i = 1,...,m$ to A^+ and A^- were calculated as following:

$$d_i^+ = \sqrt{\sum_{j=1}^{n}(G_i - A^+)^2}$$
$$d_i^- = \sqrt{\sum_{j=1}^{n}(G_i - A^-)^2} \qquad (4)$$

where d_i^+ associated with the shortest distance of option A_i, and d_i^- associated with the longest distance of option A_i. The study selects the fuzzy ideal solution A+ and A- as shown in the table. Applying the formula to calculate the distance of each choice to the optimal solution

Table 6
Fuzzy ideal solution

A^+	1	1	1
A^-	0	0	0

Step 8: Calculate the closeness value

The closeness value of each option is often used to determine the ranking order of all choices, calculated by:

$$CC_i = \frac{d_i^-}{d_i^+ + d_i^-} \quad (5)$$

Applying Eq. (4), Eq. (5) to calculate, we have the following results:

Table 7
Distance and the closeness value of the criteria

The software	d^+	d^-	Closeness value
A1 (Misa business accounting software)	0.696	46.011	0.98510
A3 (FAST Accounting software)	0.7587	46.01	0.98378
A2 (Bravo accounting software)	0.7296	46.01	0.98439
A5 (Gama accounting software)	0.7931	46.009	0.98305
A4 (Effect accounting software)	0.7633	46.01	0.98368

Source: Model analysis result

Step 9: Determine the ranking order of the options based on the closeness value

The higher the closeness value, the nearer to the ideal solution- positive ideal solution-that option is– and further away from the ideal solution- negative ideal solution. Based on this closeness value, we can identify the best option among the given options.

Table 8
Accounting software ranking

The software ranking	d^+	d^-	Closeness value
A1 (Misa business accounting software)	0.696	46.011	0.98510
A3 (FAST Accounting software)	0.7296	46.01	0.98439
A2 (Bravo accounting software)	0.7587	46.01	0.98378
A5 (Gama accounting software)	0.7633	46.01	0.98368
A4 (Effect accounting software)	0.7931	46.009	0.98305

Source: Model analysis result

So, the ranking order of accounting software is: A1>A3>A2>A5>A4

5. Conclusion

Evaluating and selecting an accounting software provider plays an important role in your business operations. To choose good suppliers, businesses first need to understand the criteria for evaluating suppliers. When choosing a business accounting software supplier, in addition to the usual criteria in choosing a supplier such as quality, price, reasonable cost, reputation, and ease of use, we must also mention the technology and software flexibility. The TOPSIS model allows the evaluating of suppliers on many different criteria. The ranking results of accounting software providers at Truong Son Technology Investment and Development Joint Stock Company show: A1 (Misa Business Accounting Software) is the best supplier, The following ranking is A3 (FAST Accounting software) and A2 (Bravo Accounting Software). This result is an important basis for businesses to prioritize supplier selection.

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