Model Recommendation Creation for New Entrepreneur using TOPSIS Method in Bandung Raya

by Eko Budi Setiawan

Submission date: 16-Dec-2021 09:54AM (UTC+0700)

Submission ID: 1731668203

File name: 3441_Eko_Budi_Setiawan_Model_Recommendation_Creation_for_New_Entrepreneur_using_TOPSIS_Method_in_Bandung_R_1372915636.pdf (726.21K)

Word count: 3129

Character count: 16775

Model Recommendation Creation for New Entrepreneur using TOPSIS Method in Bandung Raya

DOI:10.36909/jer.ASSEEE.16101

Angga Setiyadi*, Eko Budi Setiawan

*Departemen Teknik Informatika, Universitas Komputer Indonesia, Indonesia

Corresponding Author : angga.setiyadi@email.unikom.ac.id

ABSTRACT

The purpose of the research is to help new entrepreneurs make decisions in choosing and opening a business that best suits their needs so that it can facilitate marketing, which will impact increasing product sales, new entrepreneurs. The research method used in this research is a quantitative descriptive analysis that describes facts and information. The decision-making method in this study used the technique for order preference by similarity to ideal solution (TOPSIS). This research uses a case study of the community in the Ngamprah sub-district and will open a business in the Ngamprah sub-district. The results obtained from this study are that new business actors in the Ngamprah sub-district are recommended to take the type of business, for the first order is business in publishing and printing, second place is business in the advertising sector and the order. The third is the architecture business. The use of the method in this study can provide recommendations in decision making to determine new entrepreneurs in Bandung Raya. In addition to providing recommendations for new entrepreneurs, it can be easier to make decisions to determine the business that will be opened.

Keywords: TOPSIS, entrepreneurs, business, sub-district.

INTRODUCTION

Entrepreneurship is an effort to build a business or employment independently based on innovation and unique creativity so that you can generate financial benefits. Many economists claim that entrepreneurial activity is very important for the progress of the country's economy

(Haidar, 2012; Van Stel et al., 2055). Based on the Indonesian Ministry of Industry in 2018, Indonesia needs at least four million new entrepreneurs to help strengthen the domestic economic structure. The Indonesian government is spurring the growth of entrepreneurs, including small and medium industries, as well as increasing productivity and competitiveness in the digital era (Kemenperin, 2018).

There are several factors for entrepreneurship to develop, including business conditions, environment, infrastructure, and technology (Setiyadi & Agustia, 2018). Bandung city is the third-largest city in Indonesia after Jakarta and Surabaya. Bandung city has about two point five million inhabitants (Tarigan et al., 2016). The city of Bandung currently has many places to produce new entrepreneurs, one of which is a training center for cooperatives and micro, small and medium enterprises under the auspices of the cooperative and umkm office. It has a role as a business clinic in solving cooperatives and micro, small and medium enterprises (Setiyadi & Setiawan, 2020; Kurniasih & Setiyadi, 2019).

Business actors can open many businesses, but many of them are still confused about opening a business that they are going to do. Business actors must make decisions to open a business that best suits their needs and circumstances. Decision-making is a process of selecting alternative actions to achieve certain goals or objectives (Setiyadi & Agustia, 2018; Al Shra'ah, 2015; Lunenburg, 2010).

Many approaches can be used in decision support systems. One of the methods used the TOPSIS (Technique for order preference by similarity to ideal solution) method. The TOPSIS method is widely used to solve problems in practical decision-making (Diana, 2018). Topsis is widely used in research for decision-making in various fields. Several other studies have also implemented the TOPSIS method, including the TOPSIS method used for internal control to select the best employees (Rahim et al., 2018). TOPSIS method is used to select outstanding students (Sucipto & Wibisono, 2019), TOPSIS method is used for cargo delivery (Gurning et al., 2017). Based on the brief explanation previously described, it was found that research needs to be carried out to help new entrepreneurs in making decisions. Besides, in choosing and

opening a business that best suits their needs to facilitate marketing, which will impact increasing the sales results of micro business actors small and medium.

EXPERIMENTAL METHOD

The research method used in this research is a quantitative descriptive analysis that will describe the facts and information to provide a clear picture of the research carried out by emphasizing quantitative data as a benchmark for the study (Setiyadi & Setiawan, 2018). In this study, the method used is Technique for order preference by similarity to the ideal solution, which is modeled to help new entrepreneurs choose the most suitable business based on several assessment criteria and alternatives given.

The first method is Formulating research problems. The researcher conducted a preliminary study of the object under study through empirical facts obtained from several references; the second method is Theoretical references are needed to answer the formulation of problems in research. Literature studies are needed as input to provide temporary answers to the formulation of research problems (Setiawan & Setiyadi, 2018; Setiyadi & Setiawan, 2019; Priladha & Setiyadi, 2019). The third method is The topsis stage consists of ten stages. the fourth method aims to process the data obtained and conduct tests using the technique for order preference by similarity to an ideal solution. the fifth method is the final stage of the research carried out, which will obtain recommendations for opening a business with the highest priority that new entrepreneurs in marketing their products will use. Meanwhile, suggestions are made so that future research can improve the deficiencies in this research.

The research framework is a research design used as a guide in conducting the research process so that research is carried out and can run well and systematically. The research framework used in the research carried out can be seen in Figure 1.

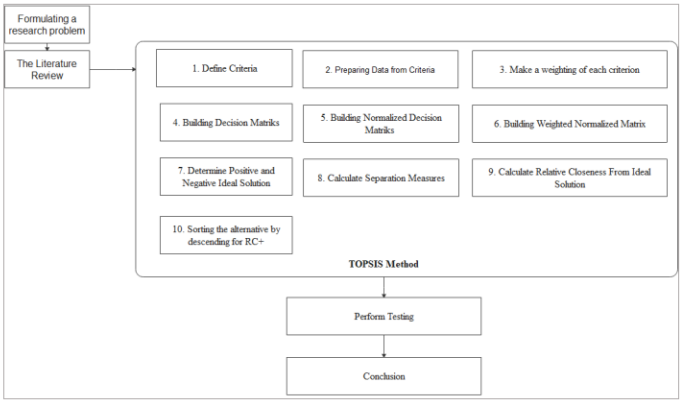

Figure 1 Location of Research, Sukajadi Street

RESULTS AND DISCUSSION

Data Analysis for New Business Actors

Data analysis of new business actors aims to see data that can be used to determine criteria in the technique preference by similarity to ideal solution. The following is the output screen of the new entrepreneurial database, which can be seen in Figure 2.

alamat_usaha		rt_2	rw_2	id_kab_kot_2	id_kecamata
Kp. Pameutingan No. 1	21B	2	9	3204	3217100
Jl. Cikutra Gg. Sukanegla	25B	2	5	3273	3217100
Taman Cibaduyut Indah Blok D No.9	33B	6	16	3204	3217100
Puri Cikoneng	13B	2	7	3204	3217100
Komp. Vijaya Kusuma A.14 no. 20	31B	7	17	3273	3217100
Jl.Ahmadi Utara	15B	2	7	3204	3217100
Kp.Nagrak	9B	4	7	3204	3217100
Komp. Vijaya Kusuma A.14 no. 20	31B	7	17	3273	3217100

Figure 2 Database of new business actors.

Analysis of Business Types for New Business Actors

Analysis, The type of business analysis aims to map the types of businesses that can be used for new entrepreneurs. There are fifteen types of businesses that can be used as business alternatives that new entrepreneurs can use. The following are types of businesses that can be used by new entrepreneurs, as seen in Table 1.

Table 1 Analysis of Business Types for New Business Actors.

No	Business Alternative	No	Business Alternative
1	Advertising	9	Music
2	Architecture	10	Performing Arts
3	Art Goods Market	11	Publishing and Printing
4	Craft	12	Computer Services and Software
5	Design	13	Television and Radio
6	Fashion	14	Research and development
7	Video, Film, and Photography	15	Culinary
8	Interactive Games		

New Entrepreneur Creation Model Case Study

Udin is a community that lives in Ngamprah District, West Bandung Regency. Udin will open a business in Ngamprah District, West Bandung Regency; the following are recommendations for determining a business.

Analysis of Determination Criteria

Analysis of criteria determination aims to determine data that can be used to determine new entrepreneurial ventures. The following are the criteria for determining the business in the Ngamprah District, West Bandung Regency, which can be seen in Table 2.

Table 2 Analysis of Determination Criteria.

No Criteria	Criteria
C1	Number of Sectors in the region
C2	Total assets in the region
C3	Total Employees in the area
C4	Average year of starting a business in the region

Calculating the Total Criteria in The Area

Calculating the total criteria aims to get the total data in one district based on predetermined criteria. The following is the SQL syntax for calculating the total criteria in the area, as shown in Figure 3.

```
DELIMITER $$
ALTER ALGORITHM = UNDEFINED DEFINER = `root` @`localhost`
SQL SECURITY DEFINER VIEW `v_masy_langkah_2_data_kriteria` AS (
SELECT
  `sektor_usaha`.`id_sektor` AS `id_sektor`,
  `sektor_usaha`.`nama_sektor` AS `nama_sektor`,
  COUNT( `sektor_usaha`.`id_sektor` ) AS `C1`,
  SUM( `wirausahawan`.`aset` ) AS `C2`,
  SUM( `wirausahawan`.`jmlh_kar` ) AS `C3`,
  AVG( ( YEAR ( NOW( ) ) - `wirausahawan`.`tahun_mulai_usaha` ) ) AS `C4`,
  GROUP_CONCAT( `wirausahawan`.`nama` SEPARATOR ',' ) AS `GROUP_CONCAT(``wirausahawan``.``nama``)`
FROM
  (
  ( `wirausahawan` JOIN `sektor_usaha` )
  JOIN `lokasi_kecamatan` ON ( ( ( `wirausahawan`.`id_sektor` = `sektor_usaha`.`id_sektor` )
  AND ( `wirausahawan`.`id_kecamatan_2` = `lokasi_kecamatan`.`id_kecamatan` ) ) )
  )
WHERE
```

Figure 3 SQL syntax to calculate total criteria in an area.

Based on the SQL syntax to calculate the total criteria in the area, Based on the SQL syntax in figure 3, there are fifteen business sectors, The following is the output screen of the SQL syntax execution result to calculate the total criteria can be seen in Figure 4.

id_sektor	nama_sektor	C1	C2	C3	C4	GROUP_CONCAT(`wirausah
1	Periklanan	90	76000000	76	2	Saepuloh,Jajang,Drs. Y
2	Arsitektur	85	54000000	8	1	E Deti Hernati,Mariah,
3	Pasar Barang Seni	45	34000000	23	3	Isti Diani Ilyas,Yarie
4	Kerajinan	43	4000000	9	4	Euis Sumiarti,Sumarno,
5	Desain	20	20000000	24	5	Fitri Laelasari Rustan
6	Fashion	24	64000000	7	2	Suryana Suryaraka,Esti
7	Video, Film dan Fotografi	50	43000000	10	1	Teti Herlina,Aries Muh
8	Permainan Interaktif	10	34000000	21	5	Indra Haryadi,Enok Kar
9	Musik	14	60000000	11	1	Wawar Farairidla Ilwa

Figure 4 Output results from the calculation of the total criteria.

Make a Weighting for each Criterion

The weighting of the topsis method aims to provide the value of each parameter in the criteria. The weighting of the topsis method aims to provide the value of each parameter in the criteria. The following is the output screen of the weighting of each criterion can be seen in Figure 5.

id	sub_parameter	bobot	keterangan	satuan
6	0 Tahun (Ide Bisnis)	1	tahun_mulai_usaha	tahun
7	1-2 Tahun (Start Up)	3	tahun_mulai_usaha	tahun
8	3-5 Tahun (Growth)	6	tahun_mulai_usaha	tahun
9	1-5 Orang	1	Jumlah Karyawan	orang
10	6-10 Orang	3	Jumlah Karyawan	orang
11	>11 Orang	6	Jumlah Karyawan	orang
12	1-5 Juta	0.5	Aset Pertahun	Juta
13	6-10 Juta	1	Aset Pertahun	Juta
14	11-20 Juta	1.25	Aset Pertahun	Juta
15	21-50 Juta	1.5	Aset Pertahun	Juta
16	51-100 Juta	2	Aset Pertahun	Juta

Figure 5 The results of the weighted value of each criterion.

Building a Decision Matrix

The decision matrix development aims to map the value of the type of business and the value of the criteria. The decision matrix development equation is as follows:

$$D = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccccc} C_1 & C_2 & C_3 & \cdots & C_n \end{array} \\ \begin{pmatrix} x_{11} & x_{12} & x_{13} & & x_{1n} \\ x_{21} & x_{22} & x_{23} & \cdots & x_{2n} \\ x_{31} & x_{32} & x_{33} & & x_{3n} \\ \vdots & & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & x_{m3} & \cdots & x_{mn} \end{pmatrix} \end{array}$$

In making a decision matrix, there are three fields used, the three names in each field are given the name c1. The following is the SQL syntax to map the value of the type of business, and the criterion value to the value c1 can be seen in Figure 6.

```
SELECT
  `a`.`nama_sektor` AS `nama_sektor`,
  `a`.`c1`          AS `c1`,
  `b`.`bobot`       AS `bobot_c1`,
  (SELECT
     SUM(POW(`b`.`bobot`,2)) AS `rumus_bobot_c1`
   FROM (`v_masy_get_id_bobot_c1` `a`
     JOIN `masyarakat_bobot` `b`
       ON ((`a`.`id_masyarakat_bobot_c1` = `b`.`id`)))) AS `rumus_pangkat_ke_2_C1`
FROM (`v_masy_get_id_bobot_c1` `a`
   JOIN `masyarakat_bobot` `b`
     ON ((`a`.`id_masyarakat_bobot_c1` = `b`.`id`)))
```

Figure 6 The SQL syntax for constructing a decision matrix for the value of c1.

Based on the sql syntax to map the value of the type of business and the value of the criteria to the value of c1 and Based on the SQL syntax to map the value of the type of business and the value of the criteria. The output screen mapping the value of the type of business and the value of the criteria to the value of c1 can be seen in Figure 7.

nama_sektor	c1	bobot_c1	rumus_pangkat_ke_2_C1
Periklanan	90	3	55
Arsitektur	85	3	55
Pasar Barang Seni	45	1	55
Kerajinan	43	1	55
Desain	20	1	55
Fashion	24	1	55
Video, Film dan Fotografi	50	3	55
Permainan Interaktif	10	1	55

Figure 7 The output of the decision matrix development for the value of c1.

Building Normalized Decision Matrix

The next step is to build a normalized decision matrix with the following equation:

$$R = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & C_3 & \cdots & C_n \end{array} \\ \begin{pmatrix} r_{11} & r_{12} & r_{13} & & r_{1n} \\ r_{21} & r_{22} & r_{23} & \cdots & r_{2n} \\ r_{31} & r_{32} & r_{33} & & r_{3n} \\ \vdots & \vdots & & \ddots & \vdots \\ r_{m1} & r_{m2} & r_{m3} & \cdots & r_{mn} \end{pmatrix} \end{array} \quad r_{ij} = x_{ij} * \left(\sum_{i=1}^{m} x_{ij}^2\right)^{-1/2}$$

The merger of several view tables created in the previous step used SQL syntax to build a normalized decision matrix. The following is the sql syntax for building a normalized decision matrix in Figure 8.

```
SELECT
  `v_masy_langkah_5_1_c1_hasil_akhir`.`nama_sektor`              AS `nama_sektor`,
  `v_masy_langkah_5_1_c1_hasil_akhir`.`hasil_akhir_langkah_5_c1` AS `hasil_akhir_langkah_5_c1`,
  `v_masy_langkah_5_1_c2_hasil_akhir`.`hasil_akhir_langkah_5_c2` AS `hasil_akhir_langkah_5_c2`,
  `v_masy_langkah_5_1_c3_hasil_akhir`.`hasil_akhir_langkah_5_c3` AS `hasil_akhir_langkah_5_c3`,
  `v_masy_langkah_5_1_c4_hasil_akhir`.`hasil_akhir_langkah_5_c4` AS `hasil_akhir_langkah_5_c4`
FROM (((`v_masy_langkah_5_1_c1_hasil_akhir`
    JOIN `v_masy_langkah_5_1_c2_hasil_akhir`
      ON ((`v_masy_langkah_5_1_c2_hasil_akhir`.`nama_sektor` = `v_masy_langkah_5_1_c1_hasil_akhir`.`nama_sektor`)))
    JOIN `v_masy_langkah_5_1_c3_hasil_akhir`
```

Figure 8 The output results of the normalized decision matrix development.

In making a normalized decision matrix, there are five fields used. Based on the SQL syntax to build a normalized decision matrix, the following is the output screen of building a normalized decision matrix, seen in Figure 9.

nama_sektor	hasil_akhir_langkah_5_c1	hasil_akhir_langkah_5_c2	hasil_akhir_langkah_5_c3	hasil_akhir_l...
Periklanan	0.40452	0.28535	0.30861	0.15430
Arsitektur	0.40452	0.28535	0.15430	0.15430
Pasar Barang Seni	0.13484	0.21401	0.30861	0.30861
Kerajinan	0.13484	0.07134	0.15430	0.30861
Desain	0.13484	0.17834	0.30861	0.30861
Fashion	0.13484	0.28535	0.15430	0.15430
Video, Film dan Fotografi	0.40452	0.21401	0.15430	0.15430
Permainan Interaktif	0.13484	0.21401	0.30861	0.30861

Figure 9 The output result of normalized decision matrix development.

Building Weight Normalized Decision Matrix

The next step is to build a weight normalized decision matrix with the following equation:

$$V = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & C_3 & \cdots & C_n \end{array} \\ \begin{pmatrix} v_{11} & v_{12} & v_{13} & & v_{1n} \\ v_{21} & v_{22} & v_{23} & \cdots & v_{2n} \\ v_{31} & v_{32} & v_{33} & & v_{3n} \\ \vdots & \vdots & & \ddots & \vdots \\ v_{m1} & v_{m2} & v_{m3} & \cdots & v_{mn} \end{pmatrix} \end{array} \quad v_{ij} = w_j * r_{ij}$$

The SQL syntax to build a weight normalized decision matrix on a percentage will result in a hundred. The following is the sql syntax for building a weight normalized decision matrix, as shown in Figure 10.

```
SELECT
  `v_masy_langkah_5_1_hasil_akhir`.`nama_sektor`              AS `nama_sektor`,
  `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c1` AS `hasil_akhir_langkah_5_c1`,
  (0.45 * `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c1`) AS `prosentase_c1`,
  `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c2` AS `hasil_akhir_langkah_5_c2`,
  (0.30 * `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c2`) AS `prosentase_c2`,
  `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c3` AS `hasil_akhir_langkah_5_c3`,
  (0.05 * `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c3`) AS `prosentase_c3`,
  `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c4` AS `hasil_akhir_langkah_5_c4`,
  (0.20 * `v_masy_langkah_5_1_hasil_akhir`.`hasil_akhir_langkah_5_c4`) AS `prosentase_c4`
FROM `v_masy_langkah_5_1_hasil_akhir`
```

Figure 10 The output results of the weight normalized decision matrix development.

Determination of the weight normalized decision matrix consists of nine fields. Nine fields are used to determine the weight of the normalized decision matrix. Based on the SQL syntax to build a normalized decision matrix, the following is the output screen of building a normalized decision matrix, seen in Figure 11.

nama_sektor	hasil_akhir_langkah_5_c1	prosentase_c1	hasil_akhir_langkah_5_c2	prosentase_c2	hasil_akhir_langkah_5_
Periklanan	0.40452	0.18203	0.28535	0.08561	0.
Arsitektur	0.40452	0.18203	0.28535	0.08561	0.
Pasar Barang Seni	0.13484	0.06068	0.21401	0.06420	0.
Kerajinan	0.13484	0.06068	0.07134	0.02140	0.
Desain	0.13484	0.06068	0.17834	0.05350	0.
Fashion	0.13484	0.06068	0.28535	0.08561	0.
Video, Film dan Fotografi	0.40452	0.18203	0.21401	0.06420	0.
Permainan Interaktif	0.13484	0.06068	0.21401	0.06420	0.
Musik	0.13484	0.06068	0.28535	0.08561	0.

Figure 11 The output results of the weight normalized decision matrix development.

Determine Positive and Negative Ideal Solution

The next step is to determine the positive (PIS A +) and negative (NIS A-) ideal solutions with the following equation.

$$\text{PIS} = A^{+} = \left\{ \underset{i}{Max}\, v_{ij}; j \in J \right\} = \left\{ v_1^{+}, v_{2,}^{+}, v_3^{+}, \ldots, v_m^{+} \right\}$$

$$\text{NIS} = A^{+} = \left\{ \underset{i}{Min}\, v_{ij}; j \in J \right\} = \left\{ v_1^{-}, v_{2,}^{-}, v_3^{-}, \ldots, v_m^{-} \right\}$$

SQL syntax to determine positives and negatives for each field is obtained by determining the highest and lowest values of the weight normalized decision matrix for each field. The

following is the sql syntax to determine positive (PIS A +) and negative (NIS A-) shown in Figure 12.

```
SELECT
  'PIS AND NIS' AS `PIS AND NIS`,
  MAX(`v_masy_langkah_6`.`prosentase_c1`) AS `max_c1`,
  MAX(`v_masy_langkah_6`.`prosentase_c2`) AS `max_c2`,
  MAX(`v_masy_langkah_6`.`prosentase_c3`) AS `max_c3`,
  MAX(`v_masy_langkah_6`.`prosentase_c4`) AS `max_c4`,
  MIN(`v_masy_langkah_6`.`prosentase_c1`) AS `min_c1`,
  MIN(`v_masy_langkah_6`.`prosentase_c2`) AS `min_c2`,
  MIN(`v_masy_langkah_6`.`prosentase_c3`) AS `min_c3`,
  MIN(`v_masy_langkah_6`.`prosentase_c4`) AS `min_c4`
FROM `v_masy_langkah_6`
```

Figure 12 Output sql syntax to determine positive and negative.

There are eight fields used, including the fields to find the largest value from c1 to c4 and the fields used to find the smallest value from c1 to c4. The following is the output screen of building a normalized decision matrix in Figure 13.

PIS AND NIS	max_c1	max_c2	max_c3	max_c4	min_c1	min_c2	min_c3	min_c4
PIS AND NIS	0.18203	0.16051	0.01543	0.06172	0.06068	0.02140	0.00771	0.03086
	(NULL)	*(NULL)*	*(NULL)*	*(NULL)*	*(NULL)*	*(NULL)*	*(NULL)*	*(NULL)*

Figure 13 Output results for determining positive (PIS A +) and negative (NIS A-).

Calculate Separation Measures

The next step is to calculate separation measures with an equation like the following:

$$D_i^+ = \left\{ \sum_{j=1}^{n} (v_{ij} - v_j^+)^2 \right\}^{1/2}, 1 \leq i \leq m$$

$$D_i^- = \left\{ \sum_{j=1}^{n} (v_{ij} - v_j^-)^2 \right\}^{1/2}, 1 \leq i \leq m$$

Calculate the separation step used to find the value of determining the positive value and the negative ideal solution in the previous step. The following is a piece of sql syntax for calculating separation measures shown in Figure 14.

```
SELECT
  `v_masy_langkah_6`.`nama_sektor` AS `nama_sektor`,
  ROUND( `v_masy_langkah_6`.`prosentase_c1`, 4 ) AS `persenC1`,
  `v_masy_langkah_7`.`max_c1` AS `max_c1`,
  POW( ( `v_masy_langkah_6`.`prosentase_c1` - `v_masy_langkah_7`.`max_c1`
  `v_masy_langkah_6`.`prosentase_c2` AS `prosentase_c2`,
  ROUND( `v_masy_langkah_7`.`max_c2`, 4 ) AS `persenC2`,
  POW( ( `v_masy_langkah_6`.`prosentase_c2` - `v_masy_langkah_7`.`max_c2`
  `v_masy_langkah_6`.`prosentase_c3` AS `prosentase_c3`,
  ROUND( `v_masy_langkah_7`.`max_c3`, 4 ) AS `persenC3`,
  POW( ( `v_masy_langkah_6`.`prosentase_c3` - `v_masy_langkah_7`.`max_c3`
```

Figure 14 Output SQL syntax fragment for calculating separation measures.

The SQL syntax separation calculation consists of sixteen fields. For category c1, the percentage field c1 has a value of 0.1820. Based on the SQL syntax fragment to calculate separation measures, the following is the output screen of separation measures shown in Figure 15.

nama_sektor	persenC1	max_c1	hasil_sm_c1	prosentase_c2	persenC2	hasil_sm_c2	p
Periklanan	0.1820	0.18203	0	0.08561	0.1605	0.005610609216	
Arsitektur	0.1820	0.18203	0	0.08561	0.1605	0.005610609216	
Pasar Barang Seni	0.0607	0.18203	0.014727278736	0.06420	0.1605	0.009274845636	
Kerajinan	0.0607	0.18203	0.014727278736	0.02140	0.1605	0.019350757449	
Desain	0.0607	0.18203	0.014727278736	0.05350	0.1605	0.011450498049	
Fashion	0.0607	0.18203	0.014727278736	0.08561	0.1605	0.005610609216	
Video, Film dan Fotografi	0.1820	0.18203	0	0.06420	0.1605	0.009274845636	
Permainan Interaktif	0.0607	0.18203	0.014727278736	0.06420	0.1605	0.009274845636	

Figure 15 Output results for calculating separation measures.

Calculate relative closeness from the ideal solution

The next step is to calculate the relative closeness of the ideal solution with the following equation.

$$RC_i^+ = \frac{D_i^-}{D_i^- + D_i^+}, 1 \leq i \leq m$$

In this section, the relative computation of the ideal solution will be calculated. The following is a fragment of the sql syntax to calculate relative closeness, as shown in Figure 16.

```
SELECT
  `v_masy_langkah_8`.`nama_sektor` AS `nama_sektor`,
  `v_masy_langkah_8`.`persenC1` AS `persenC1`,
  `v_masy_langkah_8`.`prosentase_c2` AS `persenC2`,
  `v_masy_langkah_8`.`prosentase_c3` AS `persenC3`,
  `v_masy_langkah_8`.`prosentase_c4` AS `persenC4`,
  `v_masy_langkah_8`.`D_PLUS` AS `D_PLUS`,
  `v_masy_langkah_8`.`D_MIN` AS `D_MIN`,
  ROUND( ( `v_masy_langkah_8`.`D_MIN` / ( `v_masy_langkah_8`.`D_PLUS` + `v_masy_la
FROM
```

Figure 16 The output of the sql syntax fragment for the relative closeness of the ideal solution.

Based on the sql syntax that has been made in the calculation of relative closeness from the ideal solution consisting of eight parts, c1,c2, c3 and c4 are made into a percentage, the value of D +, the value of D- and the value of the ideal solution. The following is the output screen of the relative closeness of the ideal solution, which can be seen in Figure 17.

nama_sektor	persenC1	persenC2	persenC3	persenC4	D_PLUS	D_MIN	RC_plus
Periklanan	0.1820	0.08561	0.01543	0.03086	0.0810	0.1375	0.6293
Arsitektur	0.1820	0.08561	0.00771	0.03086	0.0814	0.1373	0.6278
Pasar Barang Seni	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Kerajinan	0.0607	0.02140	0.00771	0.06172	0.1848	0.0309	0.1433
Desain	0.0607	0.05350	0.01543	0.06172	0.1618	0.0452	0.2184
Fashion	0.0607	0.08561	0.00771	0.03086	0.1461	0.0642	0.3053
Video, Film dan Fotografi	0.1820	0.06420	0.00771	0.03086	0.1014	0.1287	0.5593
Permainan Interaktif	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Musik	0.0607	0.08561	0.01543	0.03086	0.1459	0.0647	0.3072

Figure 17 Output for calculating the relative closeness of an ideal solution.

Sorting the Alternative by Descending for RC+

This step is the final step of determining the recommendation and sorting the descending alternatives for RC +. The following is the sql syntax for calculating relative closeness, as shown in Figure 18.

```
SELECT
*
FROM
`v_masy_langkah_9`
ORDER BY rc_plus DESC
```

Figure 18 The output of the sql syntax fragment to sort descending alternative solutions for RC +.

Based on the SQL syntax fragment to sort descending alternative solutions for RC +, The results obtained from the descending order of RC + for the first rank are publishing and printing with an RC + value of zero point six five two nine. The following is the output screen of sorting descending alternative solutions for RC + in Figure 19.

nama_sektor	persenC1	persenC2	persenC3	persenC4	D_PLUS	D_MIN	RC_plus
Penerbitan dan Percetakan	0.1820	0.08561	0.01543	0.06172	0.0749	0.1409	0.6529
Periklanan	0.1820	0.08561	0.01543	0.03086	0.0810	0.1375	0.6293
Arsitektur	0.1820	0.08561	0.00771	0.03086	0.0814	0.1373	0.6278
Video, Film dan Fotografi	0.1820	0.06420	0.00771	0.03086	0.1014	0.1287	0.5593
Kuliner	0.0607	0.16051	0.00771	0.06172	0.1216	0.1425	0.5396
Layanan Komputer dan Piranti Lunak	0.1820	0.04280	0.01543	0.06172	0.1177	0.1273	0.5196
Musik	0.0607	0.08561	0.01543	0.03086	0.1459	0.0647	0.3072
Fashion	0.0607	0.08561	0.00771	0.03086	0.1461	0.0642	0.3053
Permainan Interaktif	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Televisi dan Radio	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Seni Pertunjukan	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Pasar Barang Seni	0.0607	0.06420	0.01543	0.06172	0.1549	0.0533	0.2560
Desain	0.0607	0.05350	0.01543	0.06172	0.1618	0.0452	0.2184

Figure 19 Output for calculating the relative closeness of an ideal solution.

After calculating the various stages, Udin can provide recommendations for businesses that are suggested to be opened by Udin in the Ngamprah District, West Bandung Regency, which are publishing and printing, advertising, architectural business.

CONCLUSION

Based on the results of implementation and testing, it can be concluded that using the TOPSIS (Technique for order preference by similarity to ideal solution) method. It can provide recommendations in decision-making to determine the creation of new entrepreneurs in Bandung Raya, and provide recommendations for new entrepreneurs can make it easier to make decisions to determine the business to be opened.

ACKNOWLEDGMENTS

Thanks to UNIKOM and KEMENRISTEKDIKTI for help and support this research using grant Penelitian Riset Terapan with a multi-year contract number Number 7 / E / KPT / 2019 and Agreement / Contract Number 110 / SP2H / LT / DRPM / 2019, number 2898 / L4 / PP / 2019 and number 045 / SP / LPPM / UNIKOM / III / 2019 Fiscal Year 2020.

REFERENCES

Al Shra'ah, A. E. M. 2015. The impact of decision making styles on organizational learning: An Empirical study on the public manufacturing companies in Jordan. *International Journal of Business and Social Science*, **6**(4): 55-61

Diana. 2018. Metode Dan Aplikasi Sistem Pendukung Keputusan. Yogyakarta: Deepublish.

Gurning, R. S., Busse, W., and Lubnan, M. 2017. Decision Making of Full Speed, Slow

Steaming, Extra Slow Steaming and Super Slow Steaming using TOPSIS. *International Journal of Marine Engineering Innovation and Research*, **2**(1): 41-50.

Haidar, J. I. 2012. The impact of business regulatory reforms on economic growth. *Journal of the Japanese and international economies,* **26**(3): 285-307.

Kemenprin. 2018. Indonesia Butuh 4 Juta Wirausaha Baru Untuk Menjadi Negara Maju. Kementrian Perindustrian Indonesia. Https://kemenperin.go.id/artikel/19926/indonesia-butuh-4-juta-wirausaha-baru-untuk-menjadi-negara-maju (Accessed Dec. 15, 2020).

Kurniasih, D., and Setiyadi, A. 2019. Geographic Information System for Mapping New Entrepreneurs in West Java. *In IOP Conference Series: Materials Science and Engineering*, **662**(2): 022126. IOP Publishing.

Lunenburg, F. C. 2010. The Decision Making Process, *Natl. Forum Educ. Adm. Superv. J.*, **27**: 1–11, 2010.

Priladha, A., and Setiyadi, A. 2019. Designing Information System Recruitment Professional Gamers Web-Based. *In IOP Conference Series: Materials Science and Engineering*, **662**(2): 022072. IOP Publishing.

Rahim, R., Supiyandi, S., Siahaan, A. P. U., Listyorini, T., Utomo, A. P., Triyanto, W. A., ... and Khairunnisa, K. 2018. TOPSIS Method Application for Decision Support System in Internal Control for Selecting Best Employees. *In Journal of Physics: Conference Series,* **1028**(1): 012052. IOP Publishing.

Setiawan, E. B., and Setiyadi, A. 2018. Web Vulnerability Analysis and Implementation. *In IoP Conference Series: Materials Science and Engineering*, **407**(1): 12081.

Setiyadi, A., and Agustia, R. D. 2018. Penerapan Metode Ahp Dalam Memilih Marketplace E-Commerce Berdasarkan Software Quality and Evaluation Iso/Iec 9126-4 Untuk Umkm. IKRA-ITH INFORMATIKA: *Jurnal Komputer dan Informatika*, **2**(3): 61-70.

Setiyadi, A., and Setiawan, E. B. 2018. Information System Monitoring Access Log Database on Database Server. *In IOP Conference Series: Materials Science and Engineering*,

407(1): 012110. IOP Publishing.

Setiyadi, A., and Setiawan, E. B. 2019. Blind scanner Server and Batch Programming Implementation in the Process of Automatically Scan Documents. *In IOP Conference Series: Materials Science and Engineering*, **662**(2): 022068. IOP Publishing.

Setiyadi, A., and Setiawan, E. B. 2020. Private Cloud Development in West Java Cooperative and Entrepreneurship Education and Training Center. *In IOP Conference Series: Materials Science and Engineering*, **879**(1): 012036. IOP Publishing.

Sucipto, S., and Wibisono, D. K. 2019. Implementation of Topsis Method Selection of Student Achievement Lane Stmik Pringsewu. *IJISCS (International Journal of Information System and Computer Science)*, **3**(1): 27-35.

Tarigan, A. K., Sagala, S., Samsura, D. A. A., Fiisabiilillah, D. F., Simarmata, H. A., and Nababan, M. 2016. Bandung City, Indonesia. Cities, **50**: 100-110.

Van Stel, A., Carree, M., and Thurik, R. 2005. The effect of entrepreneurial activity on national economic growth. *Small business economics*, **24**(3): 311-321.

Model Recommendation Creation for New Entrepreneur using TOPSIS Method in Bandung Raya

ORIGINALITY REPORT

8%	3%	7%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	A Setiyadi, E B Setiawan. "Information System Monitoring Access Log Database on Database Server", IOP Conference Series: Materials Science and Engineering, 2018 Publication	5%
2	A Setiyadi, E B Setiawan. "Private Cloud Development in West Java Cooperative and Entrepreneurship Education and Training Center", IOP Conference Series: Materials Science and Engineering, 2020 Publication	2%
3	Submitted to University of Bristol Student Paper	2%

Exclude quotes	On	Exclude matches	< 2%
Exclude bibliography	On		