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# Geographic Information System for Mapping New Entrepreneurs in West Java

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**Abstract.** The purpose of this study is to build interactive digital maps as a system to add data to new entrepreneurs in West Java Province. The research method used was descriptive analysis method. This method describes how researchers are trying to find facts and information in situations or present events systematically, factually and accurately. This research has two stages, namely the stage of data collection and the software development stage. The results of the study indicate that: (1) Availability of an integrated database for new entrepreneurial members, and (2) Availability of digital maps as a media for monitoring the spread of new entrepreneurs in West Java. Data collection on new entrepreneurial members who still use manual methods, where entrepreneurs who will register as training members are required to write personal data on a piece of the form provided by the committee at the training center and cooperative. Moreover, now a digital map has been created as a media for monitoring the spread of new entrepreneurs in West Java. The impact of this research is that it can facilitate top-level management in monitoring the distribution of new entrepreneurial information in each city/district and providing an integrated data collection system in West Java.

## 1. Introduction

The Training Center for Cooperative and Micro, Small and Medium Enterprises (BALATKOP) is one of the regional technical implementation units (UPTD) under the auspices of the Office of Cooperatives and Micro, Small and Medium Enterprises (MSMEs) which acts as a business clinic in resolving the problems of cooperatives and MSMEs. Based on West Java Governor Article 4 paragraph 1 written that "the provincial government is targeting the creation of new entrepreneurs for a period of 5 (five) years starting from 2014 to 2018 as many as one hundred thousand new entrepreneurs distributed in regencies and cities [1]. The Office of Cooperative and MSME services is one of the regional apparatus organizations in the West Java regional government appointed to organize programs in the development of new entrepreneurs with a target of new entrepreneurs as many as 3,000 per year. The program's target for developing new entrepreneurs lies in the community, university, and high school students [2].

In supporting the new entrepreneurship development program in West Java, it is indeed going to be helpful to have support by the prevalence of distribution and monitoring of information carried out by employees in the Training Center for Cooperative and Micro, Small and Medium Enterprises. Information about the distribution of new entrepreneurs in West Java is needed by the government, especially for the Training Center for Cooperative and Micro, Small, and Medium Enterprises. The purpose is to see the location of the distribution of new entrepreneurs so that the information can be



taken into consideration by the Training Center for Micro, Small, and Medium Enterprises to create new entrepreneurs in West Java.

Based on the problems faced by the Training Center for Cooperative and Micro, Small and Medium Enterprises, there is a lack of information delivery due to the absence of a system that can display the spread of new entrepreneurs in West Java in the form of maps. Submission of information for the monitoring process and information dissemination of new entrepreneurs in West Java in the Training Center for Cooperatives and Micro, Small, and Medium Enterprises can use geographic information systems. A geographical information system is a system designed to store, manipulate, analyze, and organize and display all types of geographical data [3]. Geographical information systems consisting of software, hardware, and applications are widely known as decision-making tools. Most government institutions, private, academic, and non-academic institutions that require information based on spatial data are familiar with and use geographic information systems [4]. GIS and Web-GIS are already being used for land use maps, geology, and hazard maps are used for disaster simulation and research on dynamic management system of resource extraction sites [5][6][7][8][9]. Geographical information system for mapping new entrepreneurship in West Java is expected to overcome existing problems.

## 2. Method

The research method on geographic information systems for mapping new entrepreneurs in West Java used is descriptive analysis methodology. Descriptive analysis methodology is a method that describes every fact and information in situations or conditions or events systematically, factually and accurately [10]. The research methodology in geographic information systems for mapping new entrepreneurs in West Java has two stages including the following:

- Method of collecting data

The technique used in data collection is descriptive research, which is a research method that provides an objective description of an existing problem. The method of data collection carried out in this study is by interview, literature study and observation.

- Software development methods

The method that was carried out during the development of the geographic information system for new entrepreneurial mapping in West Java adopted the stages in the waterfall model. The waterfall model stage includes requirements definition, system and software design, implementation and unit testing, integration and system testing and operation and maintenance [11].

## 3. Results and Discussion

### *3.1. Analysis of New Entrepreneurial Business Fields at the Center for Education and Training in Cooperatives and Entrepreneurship*

In economic activity, a venture is often being interpreted as a business. Business according to the Indonesian dictionary is an activity that mobilizing energy, mind, or body to achieve a purpose of work (actions, initiatives, endeavors, effort) to achieve something and activities in the field of trade with the intention to gain profits [12]. Business activity is regulated in the law of the Republic of Indonesia number 20 of 2008 concerning micro businesses, small businesses, medium businesses, and large businesses. To increase economic activity in the community, the West Java Training Center for Cooperative and Entrepreneurship is more focused on training micro-enterprises. A micro business is a productive business owned by individuals and individual business entities that meet the criteria of micro-enterprises as stipulated in the law of the Republic of Indonesia number 20 of 2008. The following is a list of micro business sectors that receive training from West Java Training and Education Center for Cooperative and Entrepreneurship in which can be seen in Table 1.



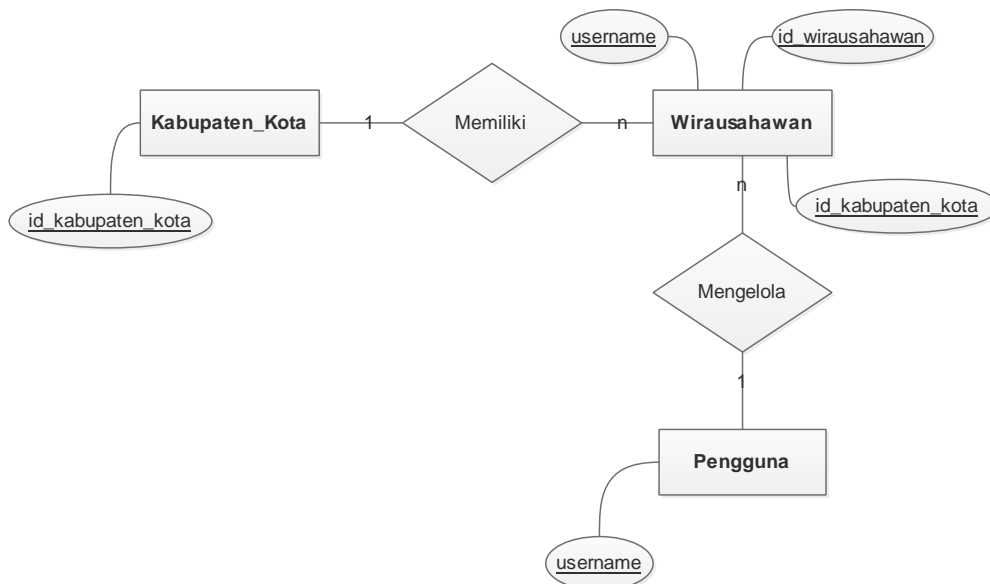
**Table 1.** List of Micro Business Fields that received training by the West Java Training and Education Center for Cooperative and Entrepreneurship

No	List of Micro Business Fields
1	Food and Beverages
2	Convection/ Sewing
3	Beauty Salon services

Based on table 1 about the list of micro business fields that received training by West Java Training and Education Center for Cooperative and Entrepreneurship, there are three kinds of micro business fields trained by them, including food and beverages, convection/ sewing and beauty salon services.

*3.2. Entity Relationship Diagram*

Entity Relationship Diagram is a tool that is used to model data with the aim of producing descriptions of a database structure [13]. The following is a picture of the Entity Relationship Diagram in Figure 1.















**Figure 1.** Entity Relationship Diagram












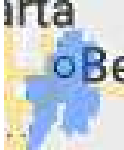


Based on Figure 1 about the entity relationship diagram consists of three entities, including entities from the district/city, entrepreneurial entities, and user entities.



















*3.3. Implementation and Testing of Digital Mapping of West Java Geographical Conditions*











West Java Province is located at the position of 5° 50' LS to 7° 50' South Latitude and 104° 48'-104° 48 ' East Longitude, with a total area of 37.173,97 km<sup>2</sup>, with 12 miles of coastal and marine areas and coastline covering 18.153 km<sup>2</sup> [14]. Digital mapping is a classic GIS approach that builds spatial images by combining layers of digital information and developing algorithms to test and visualize specific options [15]. The spatial data structure used to build the Geographic Information System for Mapping New Entrepreneurs in West Java is to use vector data models. Vector data models are data recorded in the form of coordinates of points that display, place and store spatial data using points, lines or areas (Polygon) [16]. The following is the implementation of digital mapping of the geographical conditions of West Java in Table 2.

**Table 2.** Implementation and Testing of Digital Mapping of West Java Geographical Conditions

No	Region	Name of Regency and City	Location Map	Polygon Coordinate Point	Polygon Coordinate Test
1		Bandung Regency		-6.815137,107.746868 - 6.821103,107.742405 -6.825705,107.739487 -6.830307,107.736740... -6.814370,107.746010 - 6.814583,107.746353 -6.814839,107.746611 -6.815265,107.746954	
2		Bandung City		-6.864905,107.577610 - 6.882885,107.572546 -6.890640,107.575464 -6.864905,107.577610.. -6.841598,107.597222 - 6.841556,107.597115 -6.841553,107.597080	
3	Bandung Raya	Cimahi City		-6.8317472,107.545626 - 6.8319230,107.545798 - 6.8320324,107.545981... - 6.8318283,107.545336 - 6.8318975,107.545530 - 6.8317472,107.545626	
4		West Bandung Regency		-6.818716,107.710648 - 6.792808,107.701035 -6.795535,107.684555 -6.794171,107.672195.... -6.833034,107.707901 - 6.826216,107.712708 -6.820762,107.709961 -6.818716,107.709274	
5		Bogor Regency		-6.305061,106.967697 - 6.332360,106.963577 -6.342597,106.958771 -6.350786,106.954651.... -6.307109,106.971130 - 6.305403,106.969070 -6.304038,106.968040	
6	Region I	Cianjur Regency		-7.461794,107.136183 - 7.423666,106.786766 -7.408261,106.788139 -7.416432,106.783676.. 7.443497,107.412643 -7.492516,107.375565 -7.467326,107.163391 - 7.461199,107.136612	
No	Region	Name of Regency and City	Location Map	Polygon Coordinate Point	Polygon Coordinate Test

7	Sukabumi Regency		-6.743714,106.957397 - 6.792808,107.012329 -6.880073,107.059021 -6.978228,107.078247... -6.777807,106.925812 - 6.750533,106.940918 -6.745078,106.947784 -6.743714,106.953278	
8	Bogor City		-6.5116950,106.782243 - 6.5123229,106.782455 - 6.5128013,106.782592 - 6.5133398,106.782698...- 6.5472149,106.749702 - 6.5472283,106.749733 - 6.5472564,106.749771 -6.5473117,106.7498	
9	Depok City		-6.307109,106.883926 - 6.386271,106.894913 -6.446318,106.892166 -6.307109,106.883926... -6.307877,106.873713 - 6.306192,106.880944 -6.307045,106.883905	
10	Sukabumi City		-6.743714,106.957397 - 6.792808,107.012329 -6.880073,107.059021 -6.978228,107.078247.. -6.777807,106.925812 - 6.750533,106.940918 -6.745078,106.947784 -6.743714,106.953278	
11	Purwakarta Regency		-6.424484,107.521820 - 6.417660,107.502594 -6.435401,107.466888 -6.461328,107.427063... -6.424398,107.520576 - 6.424356,107.521005 -6.424270,107.521048	
12	Bekasi City		-6.238770,106.941830 - 6.238599,106.943836 -6.238685,106.942163 -6.238002,106.941991.... -6.239453,106.943579 - 6.238770,106.943579 38642,0.0,106.943793	
13	Region II Bekasi Regency		-6.170038,106.971860 - 6.172769,107.010355 -6.174433,107.010612 -6.174518,107.008295 ..... -6.166028,106.971345 - 6.167521,106.971388 -6.169206,106.971645 -6.169974,106.971731	

14	Karawang Regency		-6.141237,107.458649 - 6.077059,107.420197 -5.969168,107.324066 -5.966437,107.280121.. -6.225886,107.621384 - 6.181516,107.530060 -6.142603,107.457962 -6.141237,107.459335	
15	Subang Regency		-6.527505,107.567139 - 6.473609,107.558212 -6.471562,107.553406 -6.450412,107.548599..... -6.612090,107.602844 - 6.590945,107.593231 -6.565025,107.572632 -6.530234,107.565765	
16	Cirebon City		-6.700715,108.566079 - 6.701304,108.566379 -6.701998,108.566689 -6.702457,108.566935..... - 6.700223,108.565828 - 6.70028333,108.565858 - 6.700715,108.566079	
17	Cirebon Regency		-6.730417,108.839836 - 6.761784,108.827477 -6.775080,108.828163 -6.788035,108.828850... -6.729735,108.831253 - 6.729053,108.834686 -6.729735,108.838120	
18	Kuningan Regency		-6.972222,108.476300 - 6.966599,108.480592 -6.961232,108.485098 -6.972222,108.476300.. 6.974309,108.470378 -6.973074,108.471966 -6.974096,108.474627 - 6.975459,108.478274	
Region III				
19	Majalengka Regency		-6.573125,108.209925 - 6.573125,108.209925 -6.578156,108.226919 -6.583869,108.246059...- 6.584210,108.200912 -6.579776,108.202972 -6.576152,108.205247 - 6.573040,108.210096	
20	Indramayu Regency		-6.230664,108.186493 - 6.242951,108.201599 -6.255237,108.205719 -6.260697,108.205719..... -6.233395,108.208466 - 6.233395,108.197479 -6.229982,108.190613 -6.229299,108.184433	
21	Garut Regency		-7.505004,107.424080 - 7.505344,107.424016 -7.505621,107.424145 -7.505791,107.424252... -7.499664,107.423630 - 7.503068,107.423286 -7.504429,107.422943	
22	Region IV Sumedang Regency		-6.761102,107.840595 - 6.750021,107.841325 -6.738770,107.840424 -6.718568,107.839136... -6.824000,107.798195 - 6.798774,107.842655 -6.772353,107.835102 -6.761443,107.840252	

23	Tasikmalaya Regency		-7.731298,107.911234 - 7.731340,107.911234 -7.731404,107.911191 -7.731383,107.911041.. -7.731160,107.911094 - 7.731224,107.911180 -7.731287,107.911266	
24	Tasikmalaya City		-7.341558,108.175657 - 7.340664,108.176676 -7.340654,108.179605 -7.341462,108.182448.. -7.341558,108.175657 - 7.340664,108.176676 -7.340654,108.179605 -7.341462,108.182448	
25	Ciamis Regency		-7.061222,108.171172 - 7.059646,108.180549 -7.061052,108.188939 -7.060413,108.190162.. 7.069719,108.188274 -7.065460,108.175893 -7.062691,108.175764 - 7.061265,108.171172	
26	Banjar City		-7.3236587,108.552044 - 7.3238811,108.552261 - 7.3241703,108.552611 .... - 7.3234653,108.551764 - 7.3235417,108.551921 - 7.3236587,108.552044	
27	Pangandaran Regency		-7.513619,108.342361 - 7.508173,108.350601 -7.488091,108.400383 -7.504089,108.406563... -7.533063,108.348026 - 7.514896,108.340108 -7.513641,108.342319	

### 3.4. Implementation of Information Mapping Page of New Entrepreneur in West Java

The implementation of the new West Java entrepreneurial information mapping page consists of three parts including the implementation of the page in West Java's geographical conditions, the implementation of a new entrepreneurial information page for Bandung and the implementation of a new entrepreneurial information page for the city of Cimahi. Implementation of the West Java Geographical Condition Page can be seen in Figure 2.



**Figure 2.** Implementation of the West Java Geographical Condition Page

- *Implementation of the West Java Geographical Condition Page*

Page implementation of geographical conditions West Java consists of four regions and twenty-seven districts or cities. Each city district has a colour that is used to differentiate boundaries between districts or cities and to make it easier for users to choose the information that will be displayed for a list of new entrepreneurs in

Implementation of Information Pages on New Entrepreneurs in Bandung City can be seen at Figure 3.



**Figure 3.** Implementation of Information Pages on New Entrepreneurs in Bandung City

- *Implementation of Information Pages on New Entrepreneurs in Bandung City*

The implementation of a new entrepreneurial information page for the city of Bandung consists of 5 fields of information displayed including information on the type of business, a name of an entrepreneur, address, length of business, gender and year. The number of new West Java entrepreneurial data for the city of Bandung from 2014 to 2017 is as many as 1319 entrepreneurs.

Implementation of Information Pages on New Entrepreneurs in Cimahi City can be seen in Figure 4.

No	Type of Business	Name of Entrepreneur	Address	Duration of the Business	Gender	Year
1	Beauty Salon Service	A Eliana Chantika F D	Jl. Raya Ciomber RT. 4 RW 6 Cimahi Tengah Cigugur Tengah Kota Cimahi	0 years	P	2017
2	Food & Drink	Ade Rusbendi	Jl. Pesantren RT 5 RW 8 Cimahi Utara Cibabat Kota Cimahi	2 years	L	2017
3	Food & Drink	eds suberman	Jl. Mukoddi no. 6 E RT 4 RW 7 Cimahi Selatan Cibaurum Kota Cimahi	5 years	L	2017
4	Food & Drink	ADEL HADIANI	Jl. Kolmas Kp. Cileulik Rt 001 Rw 014 Kel/Desa Cijogeran Kec. Cimahi Utara Kodepos: 40511	0 years	P	2016
5	Construction Services	AGUS RAHMAT SAPEI	Jl. Encep Kejawaja No 141/20 Rt 001 Rw 014 Kel/Desa Dibeureup Kec. Cimahi Utara Kodepos: 40512	1 years	L	2016
6	Beauty Salon Service	AI ROSMIATI	Jl. Rancobentang No.195 Rt 034 Rw 005 Kel/Desa Cibaurum (Kec. Cimahi Selatan Kodepos: 46313	3 years	P	2016
7	Beauty Salon Service	Aminatussyifa	♦Jalan Melang Tengah No 144 rt 02 rw 04 Kelurahan Melang Kecamatan Cimahi Selatan	4 years	P	2015
8	Food & Drink	ANDRI BUSYAIRI	Jl. Lembur Sawah No 245 Rt 005 Rw 012 Kel/Desa Utama Kes. Cimahi Selatan Kodepos: 40533	2 years	L	2016
9	Food & Drink	Andri Juwandi	Perumahan Panorama Blok N. 39 RT. 001/007 Da. Cihanjung Kec. Tanjungsari Kab. Sumedang	0 years	P	2014
10	Beauty Salon Service	Anno nurbenni fadzilah	Jln pesantren 4 RT 4 RW 15 Cimahi Utara Cibabat Kota Cimahi	2 years	P	2017
11	Beauty Salon Service	Annisa Rizqin Nur Ridhwan	Jln. Pesantren No 52 RT 5 RW 15 Cimahi Utara Cibabat Kota Cimahi	2 years	P	2017
12	Food & Drink	Anti Somariti	Kondu Pemda No 357 Padasuka Cimahi Tenoh Kota Cimahi	0 years	L	2015

**Figure 4.** Implementation of Information Pages on New Entrepreneurs in Cimahi City

- Implementation of Information Pages on New Entrepreneurs in Cimahi City

The implementation of a new entrepreneurial information page for the city of Cimahi consists of 5 fields of information displayed including information on the type of business, a name of an entrepreneur, address, length of business, gender and year. The number of new West Java entrepreneurial data for Cimahi City from 2014 to 2017 is as many as 191 entrepreneurs.

#### 4. Conclusion

This study concludes that this research has been able to produce a geographic information system for mapping new entrepreneurship in West Java so that it can help the Training Centre for Cooperative and Micro, Small, and Medium Enterprises to display the spread of new entrepreneurs in West Java.

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