Prototype of Business Directory for Micro, Small and Medium Enterprises Using Google Maps API and Multimedia

Suselo Thomas, Suyoto, Dwiandiyanta B. Yudi

Abstract—This paper explain about prototype of a business directory for micro-scale businesses, small and medium enterprises (SMEs), the third phase of the research. The third phase is the phase of software development based on the model of SME business directory that had been developed, to create prototype software SME business directory. In the fourth phase, namely the implementation, these units have been developed are tested to obtain input from potential users. The fifth phase is the testing phase to determine the strengths and weaknesses of software has been developed. The result of this phase is the software in the form of on-line (web based) and multimedia-based. Business Directory, if implemented will facilitate and optimize the access of SMEs to ease supplier access to marketing. Business Directory will be equipped with the power of geocoding, so each location can be easily viewed SMEs on the map. The map will be constructed by using the functionality of a web-based Google Maps API. The information presented in the form of multimedia that can be more interesting and interactive. Methodology used to achieve the goal: observation, interviews, modeling and classifying business directory for SMEs.

Keywords—Business directories, SMEs, Google Maps API, Multimedia, Prototype.

I. INTRODUCTION

PRODUCTION of micro-scale businesses, small and medium enterprises (SMEs) are one part of industrial development in Indonesia. SMEs are the perpetrators of the majority of the national economy. Central Statistics Agency (BPS Indonesia) last mentioned there are 51.3 million units or 99.91 percent of the business in Indonesia. That is, prolapse to SMEs will greatly disrupt the nation's economic pulse. In terms of employment is also the highest, 90.9 million workers or 97.1%.

In Yogyakarta Special Region (DIY), Indonesia, there are many SMEs are mostly engaged in handicraft industry [28]. Judging from the aspect of people's income and employment, SME sector is an excellent economic sector. Additionally SME sector is the catalyst of local economic growth and community participation to micro or family level, so that SME industry sectors have a strategic role.

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During its development, SMEs have constraints such as lack of access to suppliers and markets; limited use of technology; inefficiency; and managerial weakness also resulted in the decline of industrial SMEs. Need the support and participation of all parties in finding a solution of the constraint [5]. Problems most often arise in the development of SMEs is related to the characteristics of SMEs that is the lack of innovation and adoption of new technologies, marketing and lack of access to potential markets.

Therefore there is need for assistive technologies to help SMEs in the face of shocks and solve problems in technology adoption. One of these technologies is a business directory for SMEs. A Business Directory, if implemented will facilitate and optimize the access of SMEs to accelerate supplier access to marketing, so that SMEs location information can easily be. Business directories will be presented in the form of a map using Google Maps API technology and multimedia includes areas of the city of Yogyakarta. The development of this business directory can provide a container for SMEs and to know the location where the business is located.

II. SPECIFIC OBJECTIVES

This research aims to develop a business directory for SMEs using the Google Maps API and multimedia. Development of the directory business is conducted in three stages, namely:

1) Analysis of clustering of SMEs in the business directory, the situation and condition of existing SMEs in Yogyakarta, then grouped into a business directory. In the end will get the appropriate business directory.

2) The design prototype of SME business directory using the Google Maps API and multimedia, Of the several models generated business directory, tried to make specifications, descriptions, and the prototype software and / or hardware. The software that generated the form on-line (web based)-based multimedia.

3) Implementation for SMEs. From the resulting prototype, made of the installation and testing of prototypes to accommodate the data and chart in the form of a business directory of SMEs in Yogyakarta; socialization on SMEs (SMEs through workshop forums), as well as the application of a business directory on SMEs in Yogyakarta together.

This paper is focus on stage 2 and 3, because stage 1 has been successfully done at first year of research.

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III. URGENCY OF RESEARCH

Participation of SMEs are the backbone of local economy, because the perpetrators are almost entirely business is very weak and limited capabilities. At least three issues that urgently need an immediate solution is access: capital, suppliers and marketing [15]. To speed up the recovery of SMEs, it is necessary to bridge between suppliers, SMEs, and consumers. This can be done with the use of technology to map in a web based business directory. Given the complexity of the problems and the diversity of SMEs in DIY, then the research is done in three stages: preparation analysis business directory model, prototype design, and implementation in SMEs.

Phase analysis of the preparation of a model made for photographing the profile of SMEs. From the SME profiles, researchers can map the desire and reality (actual content) of SMEs in the interaction with suppliers and consumers. So in the end will come some models a business directory that match the characteristics of SMEs.

From the model business directory for SMEs generated, researchers conducted a prototype design stage business directory for SMEs. Design was completed with the specifications, descriptions of software. This phase will produce a prototype of SME business directory.

With the realization of a prototype, researchers need to perform installation and testing process, which is part of the implementation phase. From this process, researchers can see the advantages and disadvantages of business directories are generated in the first stage. The prototype of the model business directory can be an alternative choice for SMEs tailored to the circumstances of SMEs.

In this research the authors intend to make the analysis and design business directory for SMEs using the Google Maps API and multimedia. SMEs location information will be presented in the form of a map using Google Maps API facility that includes the city of Yogyakarta. Development List Business Directory is hoping to provide a container in the form of a web of different types of business and know the location where the business is located. This application is intended for immigrants in general, prospective investors and investors and citizens of Yogyakarta, in particular, hoping to save time to get the information you are looking for SMEs. In the system developed there are also facilities for searching the shortest path to the location of SMEs. The information presented in the form of multimedia that can be more interesting and interactive.

IV. LITERATURE REVIEW

A. Google Maps API

Google created the Google Maps API to facilitate the construction and development of web-based map applications to meet user needs. With use traditional Google Maps API, users can insert the entire facility and existing technology into a website. The main thing needed in the development of applications using this API is the API Key.API Key is the key value or a marker that should be owned website that you want to add Google Maps API facilities. API Key for each site will vary in value.

Map application development that uses Google Map API uses Javascript language. Whether it's the language Javascript language in general and specially developed by Google called Google Maps Javascript for development.

To be able to utilize the Google Maps API services. Google Maps API provides classes, types and functions that can be used to build an application.

Google Maps API is used freely in cartography [21] and resolving the issues in the debate that there is no GIS [19]. Google Maps can be run directly on the browser and does not require downloading a plug-in when using the JavaScript API. Google Maps API is easy to display the KML file, a format that is capable of displaying spatial information quickly [11]. There are many resources to learn and use the Google Maps API, the code online documentation and manual techniques [9], [2]. There are online tools that can be used such as GeoCommonsMaker, which can be used effectively [12]. Application created by using Google Maps allows users to add maps on a web page made [20]. Fig. 1 is the result of research Ross et al. [22], using Google Maps to illustrate the magnitude of criminal incidents in the District of Columbia.
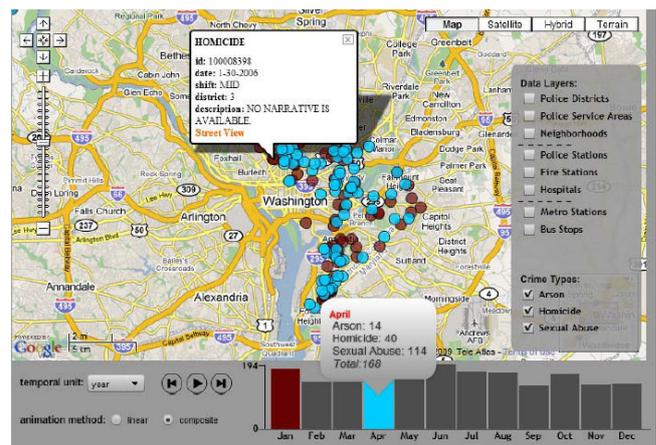

Fig. 1 Google Maps for depiction of Genesis Crime [22]

Studies conducted evoke a variety of maps, and images for the visualization system image on a web-based environment are a big part to develop visualization techniques for the development environment [1]: for ionic city imagery, geodemographics, landscape activity, etc. Hudson-Smith et al. [1] have also developed a web-based service applications that are used for public domain GIS, mapping and imaging. Johnson [13] developed a system of visualization techniques for spatiotemporal information. Johnson et al. [14] also have developed a system that can map and analyze the spread of asthma, as shown in Fig. 2.

B. Geocoding Service

One of the fundamental things related to the process of geocoding is the standard used for described a location, e.g. in the form of address. Currently, the addressing scheme used by several different countries, even countries that do not have a

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mechanism to organize addressing infrastructure. This uncertainty led to a concept and the basic parameters to perform geocoding process with a flexible addressing scheme [4].
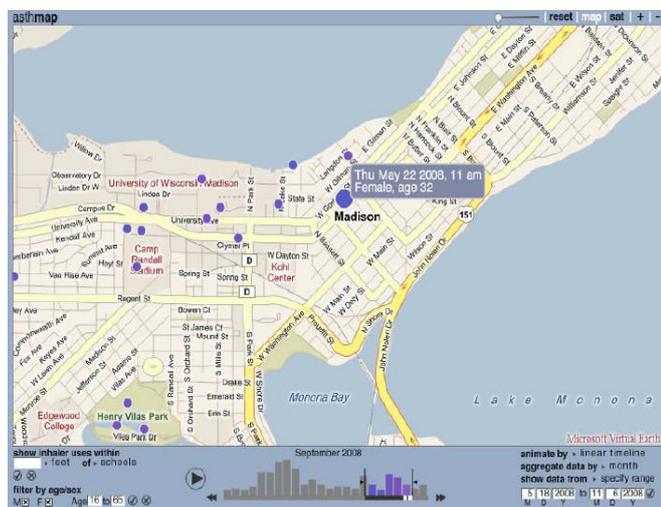

Fig. 2 Google Maps for Analysis of Asthma Disease [14]

Geocoding involves a clear descriptive location to be mapped into the x and y coordinates (longitude and latitude). Geocoding method consists of three methods, namely geocoding based on street address, zip code based geocoding, and geocoding based on a boundary (boundary). Of the three methods, based on street address geocoding method is the most accurate [6].

Other developments in the geocoding process are the growing quality of the data set descriptive location at street level (street level dataset). This quality improvement include the full geometry datri a road, the location and form certainly, attributes the growing segment of the path is complete and correct, the house numbering range and others. This allows the evolution of the geocoding process is the result of the geocoding process can be the best results (best match) [21].

Research in health-related information about people, places, events, and time, e.g. epidemic also involves the use of spatial data obtained from the geocoding process to represent the subject of research. The problem faced is how the process of geocoding can be done well in order to generate spatial data descriptive of the location of the research subjects well too. North American Association of Central Cancer Registries (NAACCR) has released a guide that can be used to help standardize the process of geocoding [10].

Geocoding service is currently also available on the Internet, such as the Free Global Geocoder (http://www.backups.nl/geocoding/), Geographic Names Information System (http://geonames.usgs.gov/), Geobase (http://geobase.ca/), Geonet Names Server (http://earth-info.nga.mil/gns/html/), and others. These services usually are one-way, or in other words, service providers have provided data that can be accessed by users of the service. This of course resulted in service providers should collect data

geocoding results from descriptive locations that typically require more resources both in time and the other side.

C. Multimedia

According to M. Suyanto in his book, Multimedia Tools to Enhance Competitive Advantage explained that there are various definitions of multimedia [27], among others:

1) According to McCormick (1996) "Multimedia is generally a combination of three elements, namely voice, image and text".
2) According to Robin and Linda (2001) "Multimedia is a tool that can create dynamic and interactive presentations that combine text, graphics, animation, audio, and video images".
3) According to Turban et al. (2002) "Multimedia is a combination of at least two media input or output of data, this medium can be eitheraudio (voice, music), animations, video, text, graphics, and images".

V. ANALYSIS AND DESIGN

A. Micro, Small and Medium Enterprises (SMEs)

From the initial observations that have been performed on a number of SMEs in the DIY, it turns out there are many parties involved in the networking of SMEs as shown in Fig. 3.
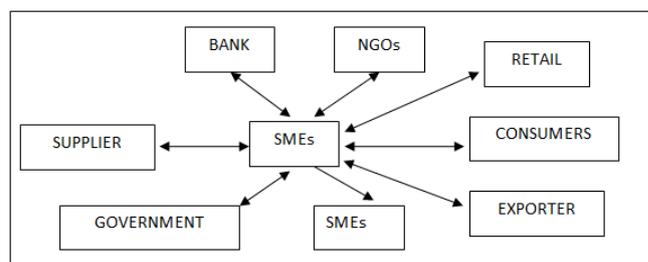

Fig. 3 Network of SMEs with various parties

From the initial observation that has been done, SMEs establish networking with suppliers and customers with a variety of shapes and ways. Consumers SMEs in part direct consumers who buy in large quantities, most are of the handicrafts retailers, galleries, and some are exporters. SME suppliers are predominantly SMEs as well.

According to Macpherson and Wilson [18], to enhance the capabilities of SMEs as one of the units supporting the new economy, the role of Supply Chain Relationship (SCR) has become one of excellence. With more and more related to the various parties as well as structured management, will increase the competitiveness of SMEs. Macro in the SCR process according to Chopra and Meindl [3] include: SRM, ISCM, and CRM as shown in Fig. 4.

SRM	ISCM	CRM
SCR		

Fig. 4 Components of the SCR

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Lang et al [16] showed that the activity of SRM and CRM can actually be akin and integrated so as to produce maximum benefit. To integrate the SRM, ISCM, and CRM, it takes the appropriate IS. In principle, Information Systems are the various components that are interconnected and work together in collecting, processing, and storing information to support decision-making, coordination, control, analysis and visualization in an organization [17].

The design of the IS for SMEs can be viewed from:
1) SME business strategy that includes three aspects, namely: virtualization and disintermediation [29].
2) Relationship between the role and relevance of marketing in SMEs that can be classified in four models, namely: dominated, led, independent, and weak [24].
3) Elements of culture and social responsibility, such as organizational culture and entrepreneurship skills [25], [8], [24].

Marketing activities of SMEs has grown into a virtual business [23], [26]. Conceptually, constraints and opportunities in SMEs is the utilization of information technology in gaining information and use it [7].

B. The Design Prototype of SME Business Directory

Software design of SME business directory includes five phases, namely analysis, design, development, implementation, and testing. In these phases are considered aspects of the consumer, the environment of SMEs, and the use and improvement of the system.

The first phase is analysis phase. This phase sets the direction of software development with the objective of developing SME business directory, the directory model profiles of SMEs and SMEs. This analysis is carried out through cooperation between SMEs and software developer in researching SMEs business directory based on the objectives to be achieved. This analysis is used to determine the specifications and software requirements.

The second phase is the design of software based on the model of SME business directory. The design of the software include database design and software interface. Software interface created using web technology. Multimedia is used to make the software more attractive.

The third phase is the phase of software development based on the model of SME business directory that had been developed, to create prototype software SME business directory.

In the fourth phase, namely the implementation, these units have been developed are tested to obtain input from potential users.

The fifth phase is the testing phase to determine the strengths and weaknesses of software has been developed. This evaluation needs to be done to improve the software. The evaluation was conducted in UAJY environment. These five phases can be repeated as necessary cyclical. The result of this phase is the software in the form of on-line (web based) and multimedia-based.

When designing the hardware business directory SMEs are the steps to produce a business directory of SMEs in the form of paper based (such as product catalogs, brochures, etc.). Steps taken almost the same with software development on top of the fifth phase also perform a cyclical repeated as necessary.

C. Implementation of Prototype Directory of SME on SMEs

From the resulting prototype, made of the installation and testing of prototypes in a few samples of SMEs; socialization on SMEs (SMEs through workshop forums), as well as the application directory on SME businesses independently or together. The third details the research activities are presented in Table I when the flow chart of research methodology as presented in Fig. 5.

TABLE I
DETAILS OF THE RESEARCH ACTIVITIES

Year	Activity
1	Analysis of the preparation of model SME ○ Identify the profile of SMEs in DIY ○ Mapping desire and reality (actual content) management of SMEs in DIY ○ Development of several models as a basis for designing SME business directory
	The design prototype of SME business directory ○ software specifications and / or hardware ○ description of the manufacture of software and / or hardware
2	○ build prototype software and / or hardware ○ testing and evaluation of software and / or hardware at the University of Atma Jaya Yogyakarta
	Implementation in SMEs ○ installation and testing of prototype software and / or hardware on multiple samples of SMEs ○ socialization on SMEs (SMEs through workshop forums);

TABLE II
INDICATORS OF ACHIEVEMENT

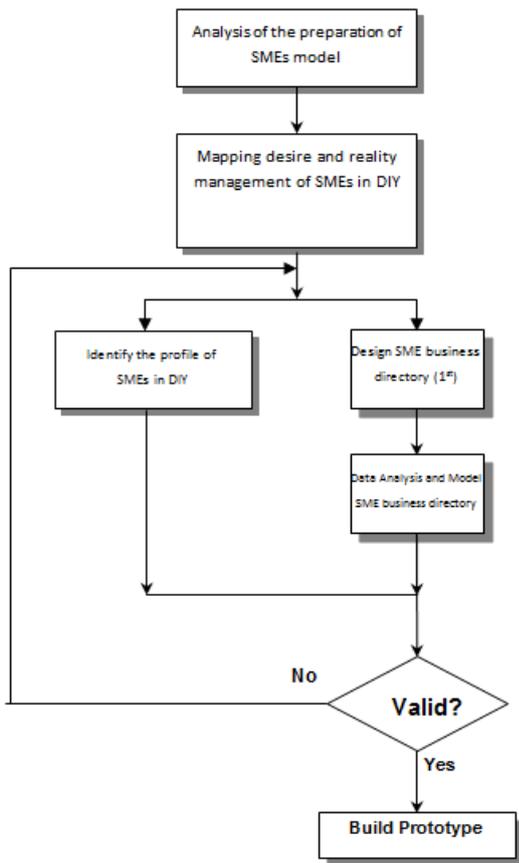| Year	Achievement Indicators
1	The formation of the most appropriate model for SME business directory • Completion of the document and the Software Requirements Specification • Document the completion of the Software Design Description
2	The product prototype is ready • Completion of design documents, and Results Description of Software Testing • Have been conducted finished product testing and revision courses • The product has been installed and deployed and can be used by all users • Socialization has been carried out through forums and workshops SMEs

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Fig. 5 Flow chart of research methodology

Entity Relationship Diagram (ERD)

Form topology database was developed from an analysis before, and described on Fig. 6.
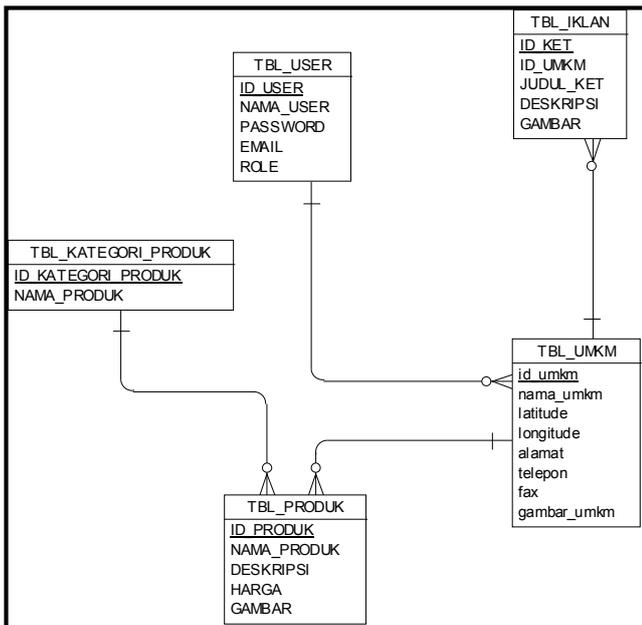

Fig. 6 Entity Relationship Diagram

The interface used to make the process of reading the data by site visitors and logged into the system by administrators and managers of SMEs described in Fig. 7. To gain access to the system, user can input name and password in the textbox available are located in the top right. To view a variety of information about the location and existing SMEs, users can search and input the desired information.

Fig. 7 User Interface of the System

Fig. 8 is a result user interface, it will appear after the user clicks on the link contained SMEs name on the map. Then will appear the following biographical data of an SME product is also available in the SME.
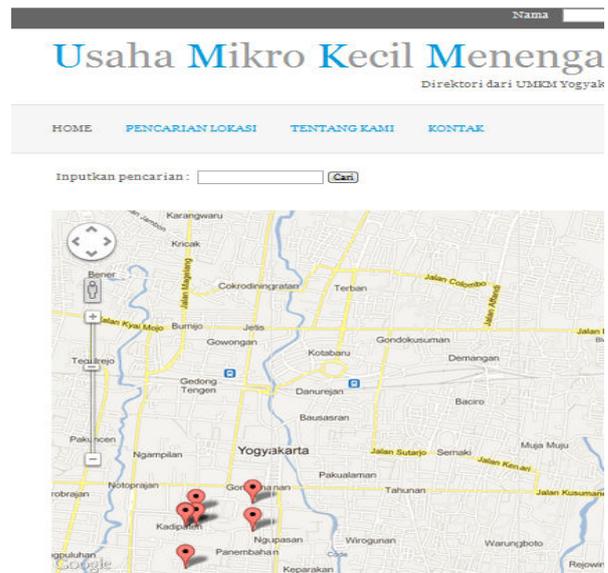

Fig. 8 User Interface of Search Result

Figs. 9 and 10 is user interface to take over management of SMEs in terms of data already doing login with Administrator

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role. On the home page, users can see all the data MSMEs. Then the admin can do the addition, editing and deletion of data. To perform additional data, admins need to press the Add Data, to edit and delete, admin just needs to click on the picture icon on the right bank of any existing data. On the start page, the admin can view all of the data categories. Then the admin can do the addition and editing of data. To perform additional data, admins need to press the Add Data, to edit, admins only need to click the icon to edit an existing image on the right bank of any existing data.

Pengaturan Data UMKM

Semua Data UMKM :

No	Nama UMKM	Nama Pengelola	Alamat	No Tel
1	Tjokrosuharto	leo	Jl. Panembahan 58	(0274)3
2	Batik Beteng	vincent	Jl. Brigjend Katamso No. 274	(0274)4
3	Batik Djawi	tomy	Jln. Rotowijayan No. 30	(0274)3
4	Rumah Batik Kedaton	Suratman	Jln. Rotowijayan No. 33	(0274)3
5	Batik Adhika	Supranoto	Jl. Kauman No.32	(0274)3

Tambah Data

Fig. 9 User Interface of Management SMEs

Pengaturan Data Produk

Semua Data Produk :

No	Nama Produk	Nama Kategori Produk	Deskripsi
1	Babi Kecap	Makanan	Harga : 10.000,0
2	Babi Rica-Rica	Makanan	Harga : 10.000,0
3	Sup Babi	Makanan	Harga : 8.000,00
4	Iga goreng	Makanan	Harga : 10.000,0
5	Sate Babi	Makanan	Harga : 10.000,0

Fig. 10 User Interface of Product Management SMEs

VI. CONCLUSION

Preparation of a prototype methodology for SME business directory assists in conducting the research process step by step. Business directory is valuable tool for SMEs to introduce market and expand the market. Relationships in the SME network to be good because of all activities can be conducted directly and transparently. This prototype can be developed further to do in the real implementation in the SMEs so that immediate benefits for SMEs.

Now It has successfully established a business directory mapping method of Micro, Small and Medium Enterprises (SMEs) using a web-based system to facilitate the management of SMEs, product and search for visitors, so that access to information is more current than the traditional methods based on the use of hardcopy and basic telecommunications facilities such as telephone and fax.

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