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Model of Radar Zakat (RAZAR) Application using Community Approach Integrated to Digital Map

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Abstract: Zakat, Infak and Shodaqoh (ZIS) is an obligation for Muslims to create a sense of justice for others. There are already several institutions that handle ZIS, either directly formed by the state or from the community. Each Zakat institution has already a system used to record the Muzakki (the person giving the Zakat) and Mustahiq (the recipient of Zakat). There are some disadvantages to the current system, namely, first there is a gap against the number of Zakah receipts and Zakat distribution numbers. Second, the data between Zakat institutions that have not been integrated, so, it will be susceptible to have redundant data. Third, Mustahiq data searching process is still very limited and seems difficult. Fourth, there are still many Muzakki who give ZIS without going through Zakat institution and the operational cost of ZIS institution is still high. This study contributes to minimize these problems by making a model of Radar Zakat (RAZAR) application using three approaches with case studies in Indonesia. First, an approach involving community collaboration in a local social environment that can actively recommend and review Mustahiq candidates. Second, create an integration model by designing a proxy database by providing Application Program Interface (API) that can be accessed by Zakat management institutions for data exchange. Third, the use of map technology based on Global Positioning System (GPS) with the help of API from Google Maps to show the location of the Mustahiq, so, the ZIS distribution becomes faster.

Key words: ZIS, recommendation, review, Google Map, Zakat information system, Mustahiq, Muzakki

INTRODUCTION

Indonesia is a country with the world's 4th largest population, under China, India and the United States with a population of 255,461,700 souls. Approximately 88.1% or about 205 million people of the population, embraced Islam (Anonymous, 2017). This makes Indonesia the country with the largest Muslim population in the world above Pakistan and India. However, based on data from the Indonesia central bureau of statistics in May 2016 there are about 27.76 million people or about 10.7% of the population in Indonesia fall into the category of poor (Anonymous, 2017). In order to help the inhabitants of the poor category in Islam there is an obligation for Muslims to issue Zakat, Infak and Shodaqoh (ZIS) to the needy. Some of the obligations associated with ZIS are contained in many Verses of Al-Quran (written 58 times in Al-Quran) as well as Hadist.

With these obligations, Zakat, Infaq and Shodaqoh (ZIS) can be a solution to help in alleviating poverty. This is in line with ZIS institutions growth data which from year-to-year has positive growth as can be seen in Table 1. Similar data can also be seen by Husti *et al.* (2017). This is particularly interesting to note, especially, in 2008 and 2009 as Indonesia's economic growth declines, apparently ZIS association growth continues to rise (from 920-1200 billion).

Table 1: Number of ZIS institution in Indonesia (Year 2002-2015) (Anonymous, 2017)

Years	Rupiah (Billion)	USD (Million)	Growth (%)	GDP growth (%)
2002	68.39	4.98	-	3.70
2003	85.28	6.21	24.70	4.10
2004	150.09	10.92	76.00	5.10
2005	295.52	21.51	96.90	5.70
2006	373.17	27.16	26.28	5.50
2007	740.00	53.86	98.30	6.30
2008	920.00	66.96	24.32	6.20
2009	1200.00	87.34	30.43	4.90
2010	1500.00	109.17	25.00	6.10
2011	1729.00	125.84	15.30	6.50
2012	2200.00	160.12	27.24	6.23
2013	2700.00	196.51	22.73	5.78
2014	3300.00	240.17	22.22	5.02
2015	3700.00	269.29	21.21	4.79

This makes some researchers try to dig deeper related to the potential of ZIS in Indonesia (Firdaus *et al.*, 2012).

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In their research conclusion they mentioned that the potential of Zakat in Indonesia is about 217 trillion rupiah or about 3.4% of the Indonesian economic growth in 2010. This means that the total number of ZIS associations in 2015 only amounts to 1.3% of the potential. This is one of the issues that must be addressed from by Zakat stake holders in Indonesia, so, the potential of this ZIS obligation becomes more increased. Some of the ways to improve the success of the LAZ (Lembaga Amil Zakat or Amil Zakat Institution) program can be seen from Hassan and Rom (2016) and Nurhayati and Susanto (2017).

In order to facilitate this obligation, the Indonesian Government established a National Amil Zakat Agency (Badan Amil Zakat Nasional or BAZNAS) based on Presidential Decree No. 8 of 2001 dated January 17, 2001. In addition to BAZNAS, Amil Zakat institutions that have also been established by individual groups who usually, use the foundation, for example, Dompet Duafa, RumahYatim, PKPU et cetera. The main activities of these institutions are to collect ZIS from the community and other institutions (companies) and to distribute the ZIS funds to the communities included in the 8 categories of ZIS recipients, according to the Quran, i.e, indigent, poor people who have debts, converts, fighters in the way of Allah, long traveller or students the receiving and managing committee of Zakat.

In carrying out its main tasks in terms of collecting and distributing ZIS funds, the ZIS management institutions have several weaknesses such as there is a significant difference between the funds raised and distributed as stated by Anonymous (2017), Dahlan *et al.* (2015), Dwipratama (2011) and Rahman *et al.* (2012). As recorded in 2015, the ZIS funds that can be collected by BAZNAS and LAZNAS are 3.67 trillion. While the funds that were successfully distributed were only 2.25 trillion. This means that funds distributed as much as 61.6% only reached a level of quite effective.

The relationship between Zakat recipient institutions in a system has not yet been integrated each Zakat institution manages its own system which results in Muzakki and Mustahiq data likely to be recorded in several Amil institutions (data duplication) (Sukmana and Iswara, 2016; Iskandar, 2015; Wahab and Rahman, 2011). Mustahiq and Muzakki data are still very limited and seem difficult to obtain. This can be seen from the large number of Muzakki data that entered the BAZNAS information system which only numbered approximately 120,000 people and Mustahiq data totaling 109,917 people (Anonymous, 2017).

There are still many Muzakki who give Zakat without going through the Amil Zakat body (Hermawan *et al.*, 2015; Darma *et al.*, 2017). High operational costs in the Zakat collecting process (Alwi, 2014), there is even an Amil Zakat institution that uses 16% of total revenue where in the Zakat funds are only 20% of the total income. The reseach by Alwi (2014) use officers to invite people to become donors. There is an opinion that with the presence of officers it can generate a lot of funds.

The objective of the research: In this study, we contribute to find the right application model to minimize the problems mentioned above. The model created is obtained from the results of the analysis of the study literature both those related to the Zakat application and other applications. In order to finalize the design further we held a Focus Group Discussion (FGD) with Zakat stakeholders to ensure that the model was made according to the needs, namely the need in terms of technology and also the rules of Zakat (Sharia). The model created produces several modules and variables that must be in the design of the application that will be made, namely, module collaboration between communities which is then detailed in the recommendations and review variables for people who will receive ZIS. The second module is a search module for candidates for Mustahiq and Mustahiq using digital maps (Google Maps). The third module is related to the integration process between LAZ.

Literature review: Construction of the Muzakki and Mustahiq registration system in Zakat institutions analysis and design of the Zakat application system have already been oftenly carried out such as by Udin (2016), Swara and Hakim (2016), Sasongko *et al.* (2014), Abral and Harianto (2016), Pribadi *et al.* (2010), Hidayatullah and Arief (2016) and Rifa'atunnisa and Cahyana (2014). Some researchers use client-server bases in creating their applications, some are using web technology and also mobile technology (Android). However, almost all of these studies are still local, in the sense that the application is devoted to Amil institutions in certain areas for example the constructing of Zakat applications, for the great mosque of Palembang, Padang, Surabaya and so on Table 2 (Pribadi *et al.*, 2010).

Table 2 show is a list of some of the study literature related to constructing Zakat applications. Each literature is explored from the side of the research object and the modules developed. It was obtained that the most module made was the registration module of ZIS giver (Muzakki) and Mustahiq. Among the literature that includes the Muzakki registration module such as Udin (2016), Swara and Hakim (2016), Abral and Harianto (2016), Pribadi *et al.* (2010), Hidayatullah and Arief (2016) and

Table 2: Researches based on research objects

Paper #	Research objects	Muzakki registration	Recommendation of Muzakki and Mustahiq	Mustahiq registration
Udin (2016)	Mosque of Al-Huda Karah Surabaya	v	-	-
Swara and Hakim (2016)	BadanAmil Zakat Masjid Raya Andalas Kota Padang	v	-	v
Sasongko *et al.* (2014)	LembagaAmil Zakat Masjid Baiturahman Semarang	-	-	v
Abral and Harianto (2016)	Lhokseumawe city	v	-	v
Pribadi *et al.* (2010)	Baitul Maal Wat Taanwil Masjid Al-Azhar Cabang Cileduk	v	-	v
Hidayatullah and Arief (2016)	BadanAmil Zakat Masjid Agung Baitul Qadim Loloan Timur	v	-	v
Novansyah *et al.* (2015)	Palembang great mosque	v	-	v
The proposed system		v	v	v

Novansyah *et al.* (2016). As for the Mustahiq registration module, most of the literature include it except (Udin, 2016). There is one literature that includes the Zakat calculator module, i.e., (Swara and Hakim, 2016).

The Mustahiq data collection process is carried out by the admin or officers who have access rights. A similar process is also used to record the Muzakki, it takes special officers who are tasked to input data into the system. The problem arises when there is no data to be inputted by the officer be it Mustahiq data or Muzakki data.

These data are usually obtained in two ways. First, Mustahiq or Muzakki come directly to the Amil institution to ask for help or to give a donation. The second way is usually to search data by field officers or volunteers from the Amil Zakat institution. This second way will succeed if the field officer does have sufficient ability and time. In addition, the area also affects the amount of data that officers can search for. Some times the existing officers because of their nature are volunteers, look for data only at certain times or if they get information from the community.

In the application system model that will be built in this study, the search process for Mustahiq candidate data no longer relies on Amil institution field officers but tries to explore the potential involvement of the surrounding community to report if there are neighbors or relatives who really need help by recommending giving a review and giving the score to the Mustahiq candidate. Thus, data collection is expected to be faster (real time and up to date) and more precisebased on the needs.

Integration of Zakat system among Zakat institutions: Among of the many studies that developed the Zakat information system above, almost all discussed the registration process of Muzakki and Mustahiq in a case study for an Amil institution. Not many researchers are trying to build a Zakat information system that can integrate Muzakki and Mustahiq data between institutions of Amil Zakat. We found three studies that discussed the integration process such as Dwipratama (2011), Iskandar (2015) and Gufroni *et al.* (2014).

However, from the three studies, only a research done by Iskandar (2015) who tried to create an integration mechanism, especially, Mustahiq data integration. Research tries to apply rest service technology by using a Service Oriented Architecture (SOA) approach. In creating these services, first, the researcher must define the business processes of the existing Amil Zakat institutions (BAZNAS, Lazismu and Rumah Zakat). Then rest service is made, so that, the data exchange process (parsing) can be done. This research is in line with the research that we will build. The data integration mechanism from the research that we will design is using webservice technology. However, we will not focus on the business processes of each Zakat institution but try to create a general template that is expected to be used by all Zakat institutions.

While a research made by Dwipratama (2011) more towards the integration of modules in the BAZNAS information system. They see that the existing system has not integrated the ZIS fundraising module with the donation distribution module. In addition, they also added several modules needed in this system among them modules, reports, program distribution and the addition of Zakat maal categories. The contribution of this research is quite clear but from the context of Muzakki and Mustahiq data integration nationally between the Amil Zakat institutions) research cannot provide a solution.

The Zakat information system integration with BAZNAS was carried out by Gufroni *et al.* (2014) by creating an independent Zakat system with the BAZNAS of Tasikmalaya case. The architecture built is client and server based. This architecture in our opinion does not have a contribution to unify data or shared data usage between Amil Zakat institutions because it has not used web services.

The use of the website is also very important in order to disseminate information related to the collection and distribution of Zakat to an Amil Zakat institution (Nim, 2015). This information must be supported by the speed and actuality of an information, including information updates. The use of websites is important and it seems that all systems built in several studies have indeed used

web-based technology. Integration is a concept not just a website information related to the transaction process that exists in the Zakat institution.

MATERIALS AND METHODS

The logic of research methodology: In the process of building a model and design of this Radar Zakat application, the Framework for the Application Systems Thinking (FAST) introduced by Whitten and Bentley (2007) used. The stages of FAST are scope definition up to the installation delivery. This research will not use all the phases because we will focus on the discussion of modeling and application design not on applications constructing and testing, so that, some stages such as physical design and integration, construction and testing and installation and delivery are not used.

In detailing the stages in FAST, several processes from the critical realism methodology are introduced by Carlsson (2004) used. This method is used to form anontology (concept) related to the existing Zakat system then is done critically to the existing social phenomena. After the theory was formed then in this research is translated into a model.

Research sample and location: This study uses a qualitative approach with data interviews from the South Tangerang city BAZNAS, central BAZNAS, central LAZ Dompet Duafa and Zakat experts from Syarif Hidayatullah Jakarta State Islamic University, the Directorate of Zakat, Infaq, Shodaqoh and Wakaf of the Republic of Indonesia Ministry of Religious Affairs. A careful object is a system that is made on Zakat institutions both national and local (only in certain cities).

Research stages: This study consists of several stages (Fig. 1). Data collection process consisting of literature review, stakeholder interviews and observation. Literature study was taken from international and national scientific journals, conference proceedings, unpublished research results and reports. Interviews were conducted with experts from LAZ and Zakat experts from the Post Graduate School of Syarif Hidayatullah Jakarta State Islamic University. Observation is done by visiting and seeing the systems that exist at LAZ. Output from this scope definition stage is a problem statement.

Then it is continued with identification of variables and possible technologies used to solve research problems (problem analysis). The variables and technologies proposed were obtained from the study literature. These various variables and technologies are then analyzed for the variables and technologies to be used. The output of this stage is a improvement objective system in the form of a model that can solve problems in the previous stages. The process of designing the Radar Zakat application starts with validating the existing model. The validation process is carried out by conducting Focus Group Discussion (FGD) with Zakat stakeholders such as BAZNAS, LAZ and Zakat experts from the campus of the Syarif Hidayatullah Jakarta State Islamic University. The output of this process is a system design using Unifield Modeling Language (UML) in the form of a use case.

Data analysis: The analysis stage to determine the, radar Zakat application model is the most important step. The approach taken at this stage of analysis is to conduct interviews with stakeholders of Zakat and literature studies. Analysis of the models, especially, related to

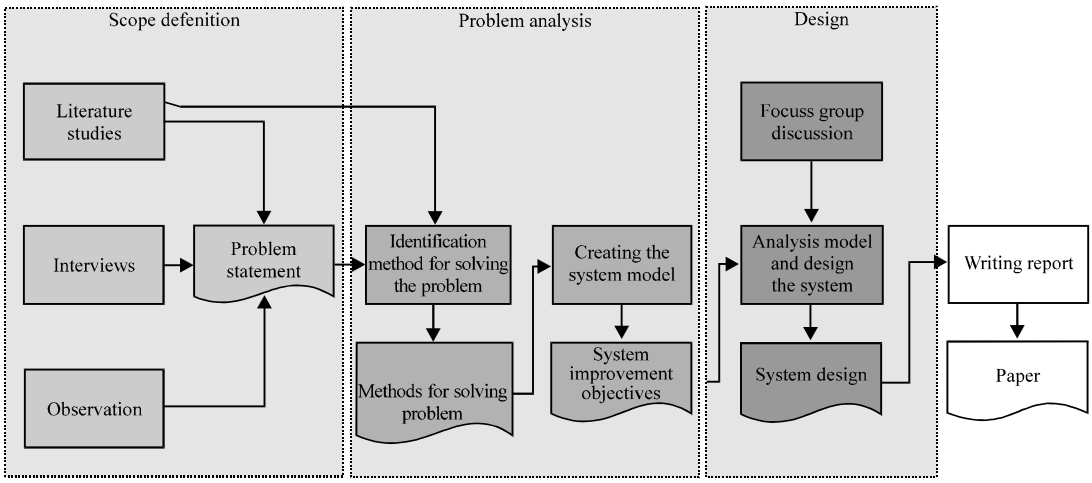

Fig. 1: Procedure of research

the problem-solving model is done by carrying out focus group discussions in accordance with the problem analysis stage in Fig. 1.

Problem analysis

Method's identification: This chapter discusses the identification of the methods used in finding the model and designing the RAZAR application. The selection and analysis of any variables and technologies that must be included in this system will be discussed here. In this phase we begin by looking back at the 5 issues mentioned in Chapter 1, namely, up take on the distribution of Zakat which is still low, the system has not been integrated between ZIS institutions, Mustahiq and Muzakki data is still very limited there are still many Muzakki who donate directly to Mustahiq and high operational costs of ZIS institutions. Then look for the cause of the problem by conducting a literature study, observing the existing system and conducting interviews with the Zakat stakeholders.

Literature study conducted using a search of studies related to the development of the Zakat system, the integration of Zakat and the use of Application Programming Interfaces (API) from Google Maps. The literature used is obtained from a collection of journals and conference proceedings obtained from searches through the Google (Google scholar) search engine and several other research databases such as IEEE Xplore, ACM and indexed journals. In line with the literature search process, we also look at existing systems, including conducting field observations of systems that have been used nationally, namely the SIMBA system (BAZNAS system). Especially to see the SIMBA application we have done it while doing previous research (Sukmana and Iswara, 2016). While the interview discussed the development of the RAZAR system was carried out by inviting several speakers, namely from South Tangerang BAZNAS, central BAZNAS, IT managers from one of LAZ, the Director of Zakat, Infaq, Shodaqoh and Wakaf of the Indonesian Ministry of Religious Affairs and experts conducting research related to ZIS from Syarif Hidayatullah Jakarta State Islamic University postgraduate program and expert in making information systems. All interview results are recorded in the form of mp3 files (Fig. 2).

Before analyzing the methods used to find solutions to existing problems, first thing to do is to find the cause of these problems. From the results of the interviews, we found that some of the problem causes were as shown in Fig. 2. In Fig. 2, there were four interviewees who were interviewed in 1-4, namely, member of the South Tangerang BAZNAS commission, Director of Zakat, Infaq, Shodaqoh and Wakaf of the Republic of Indonesia Ministry of Religious Affairs, director of BAZNAS central distribution and IT manager of Dompet Duafa.

From the 4 causes described by the informants two items were obtained, namely limited resources for finding the Mustahiq and some Muzakki do not have trust to LAZ which is the cause of more than one problem. This research uses these 2 causes to find the right solution model before finally, making a design of the Radar Zakat application.

Method of trust enhancement: The issue of trust is the biggest problem of an Amil Zakat institution. At least the problem of potential ZIS that has not been exploited (problem point 1) Muzakki and Mustahiq data that are still

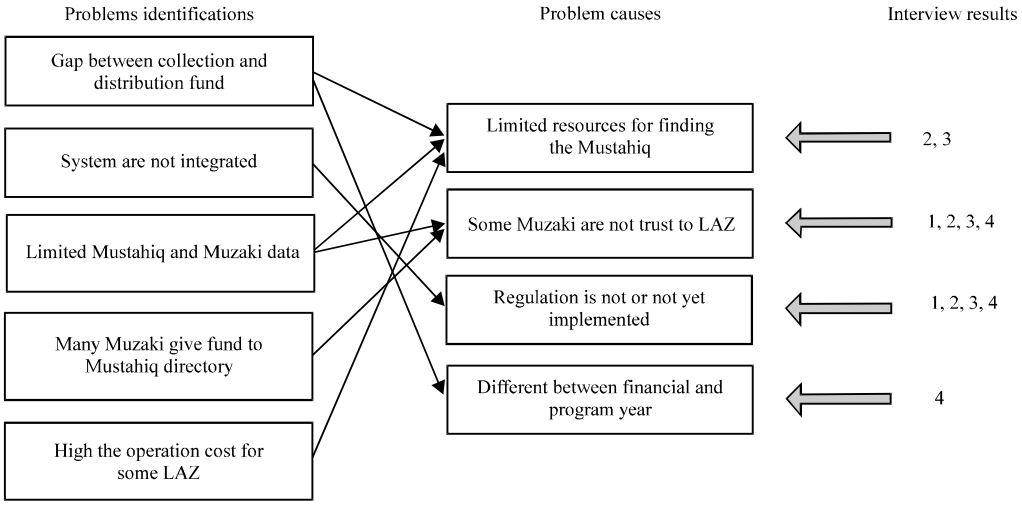

Fig. 2: Problem identification and causes

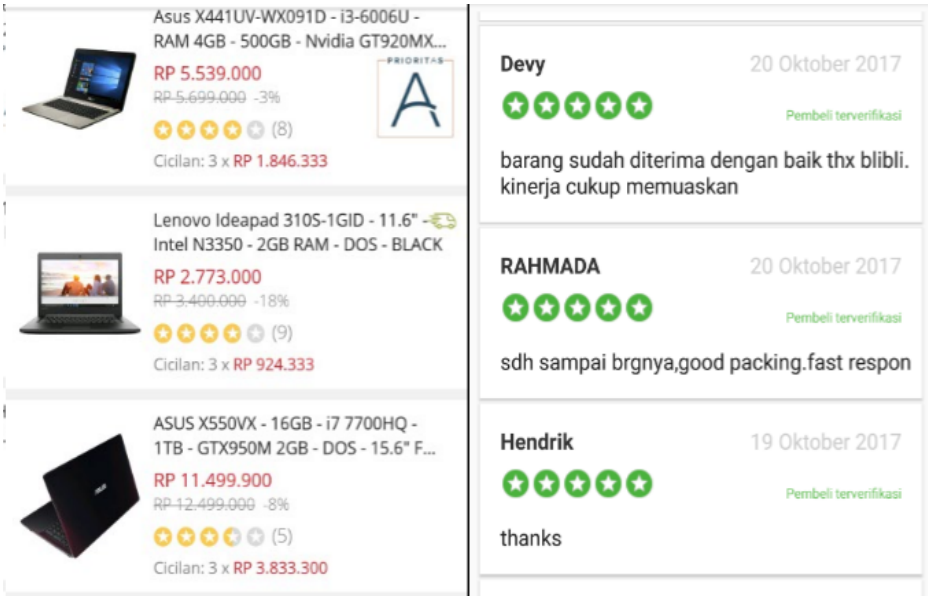

Fig. 3: Recommendation and review

lacking (problem point 3) and the number of Muzakki who give direct donations without going through the Amil Zakat institution (problem point 4) can be solved, if the level of public trust in the institution Amil Zakat is maintained. In order to solve this trust problem, we compare it with online e-Commerce transactions that currently show a positive level of development compared to when e-Commerce started in Indonesia. Based on data obtained from the Solopos news site which refers to BPS data there is a growth of e-Commerce up 17% with a total number of businesses reaching 26.2 million units. This data proves that there has been a change in the pattern of public trust in these online buying and selling transactions.

There are many factors that influence the level of public trust such as those that have been examined by Imani *et al.* (2017). The study looked at the role of reviews and recommendations that affect the level of consumer confidence to buy goods online. Review and recommendations are the means of the community to provide input, complaints and satisfaction with something Fig. 3. Recommendations can be made in the form of scoring while reviews in the form of words to express perceptions that can later build preferences of a product. The process of sharing information and collaboration like, so is usually called knowledge sharing.

Knowledge sharing is an activity related to social interaction in the form of sharing knowledge, skills and experience. There are three factors related to one's motivation in sharing knowledge, namely internal factors and external factors. Internal factor such as is doing activities due to desire, such as interest and pleasure (while external factors are caused by the need to make a profit) (Ryan and Deci, 2000).

In industries that involve the world of marketing, knowledge sharing is also very important. Customer expectations are usually formed from past experiences, information and recommendations from close friends or from many people. From several knowledge sharing process which is often used to grow the satisfaction and trust is the use of variable recommendations and promotions (Imani *et al*., 2017). The recommendation as stated by Parasuraman *et al*. (1985) use the term Word of Mouth (WOM) where the term shows a direct relationship between expectations of customers. The higher the intensity of the recommendation, the higher the expectations of a consumer for an item. Meanwhile, the promotion is no less important. According to Kalwani and Yim (1992), items that are not or rarely promoted will be abandoned by the customer because the customer assumes that the item has poor quality.

In this study, we adopted the concepts and models of knowledge sharing collaboration in the form of a recommendation system for e-Commerce into the RAZAR information system. Every member of the community can collaborate by providing recommendations and also reviewing candidates for Mustahiq. So, the more recommendations and reviews from the community towards the Mustahiq candidate the higher the level of Muzakki's trust to give the donation to the Mustahiq candidate.

Integration method between Zakat systems: There are several ways to integrate the information systems such as by using Enterprise Resource Planning (ERP), Service Oriented Architecture (SOA) and Enterprise Application Integration (EAI). ERP initially uses a comprehensive approach and usually starts from the level of business processes of an organization or company. So, the nature of this ERP integration method is the centralization of a large end-to-end system. A very well-known example, of using this ERP method is SAP Software from Germany. Judging from its nature this ERP approach is suitable for a company that has a very long business process such as manufacturing. This method is not very suitable for the integration of several companies that already have separate systems, such as systems that have been implemented by LAZIS and BAZIS.

Meanwhile the approach to using SOA can connect different applications (differences in development platforms differences in programming languages, etc.) by prioritizing the creation of services. The service is independent and does not depend on other services (Goel, 2006). However, a service can also communicate with other services as a bridge between systems integration. The initial approach to SOA for intranet applications is Common Object Request Broker (COBRA) and Distributed Component Object Model (DCOM) (He and Da Xu, 2014). For current conditions there are many web-based road applications, so, the approach taken is to build a webservice. In accessing webservice there are two approaches, namely using Simple Object Access Protocol (SOAP) and Representation State Transfer (REST). The fundamental difference between SOAP and REST is the use of XML language on SOAP.

Because the application systems of each LAZIS and BAZIS are separated from each other (both programming languages, platforms and business, processes) for example, the BAZNAS system uses a web-based platform the system in dompet duafainstitution uses a desktop-based platform while Rumah Zakat uses web based, so, the approach that we use is REST approaching. This is also similar to some studies that try to integrate several systems without changing the existing system such as Thu and Aung (2015), Hong *et al.* (2016), Mahmoud *et al.* (2015) and Moss (2014).

Mustahiq data searching and filling method: The effectiveness of Mustahiq data search is very important for Mustahiq data collection business process in BAZIS and LAZIS. With a fast, efficient and effective search, it can minimize uptake problems that are still in sufficient category (problem No. 1) and decrease in operational costs for search Mustahiq (problem No. 5). BAZNAS has taken some good steps in accordance with the existing regulations using the Zakat collector unit (UPZ-Unit Pengumpul Zakat) which is distributed through mosques and by forming a separate unit that is used to search Mustahiq which they call "Umar IbnKhatab's Troops" (interviews with director of BAZNAS central distribution). The use of UPZ is quite precise even though it turns out that the data and problems that are still far from the existing expectation (Zakat potential in Chapter 1). While the formation of Umar IbnKhatab's Troops can increase the operational costs of a Zakat institution.

Another approach that is very effective is to use the community, the nearest environment and family where people who are in the environment or who know the exact conditions of the Mustahiq candidate can recommend. The more people recommend, the more potential they will get recognition from Amil institutions. Collaboration in the community will be very useful in improving the search process because this is one of these cultures that has become an indigenous culture of Indonesia, namely mutual cooperation (Astawa and Sudika 2015; Rahman and Muhibbin, 2017; Syafiq, 2016 and Tatik, 2014).

In order to make the data collecting and searching process be more effective and more precise, several approaches are taken by online taxi and taxi bike applications such as Gojek, Grab and Uber which utilize the community and successfully create eco systems between vehicle owners, passengers and also to food vendors, house cleaning staff etc. In addition, the system is built more effectively with the help of digital maps that are connected to GPS and the internet (Anindhita *et al.*, 2016; Papuko, 2017).

The users can control the location of the taxi and taxi bike that will be used and can know how many minutes they get to the location. Utilization of GPS in mapping applications has been used in various studies, for some studies in Indonesia alone such as Mahdia and Noviyanto (2013), Amri (2011), Suharto *et al.* (2010) and Sukmana and Iswara (2016). The research done by Mahdia and Noviyanto (2013) is to build an application for logistics if a disaster occurs at the, National Disaster Management Agency (BNPB-Badan Nasional Penanggulangan Bencana) while a research done by Amri (2011) made an application for the navigation in Surabaya and (Suharto *et al.*, 2010) which is used to search for the nearest taxi location.

The system development process is carried out by utilizing technology that has been created by google, namely Google Maps. Google Map provides an Application Program Interface (API) that can be accessed by developers who want to know the position of an object

based on maps and coordinates based on GPS. The application of Google Maps utilization has long been utilized but it is growing after online taxi and taxi bike applications in Indonesia such as Gojek, Grab and Uber. The Mustahiq searching and data collection method can be done by adopting the concept of taxi or online taxi bike with the use of digital map technology, combined with the use of the community community (being extended to LAZ).

RESULTS AND DISCUSSION

Proposed model of RAZAR system: Based on the problems and causes of problems in the object of this study, we modeled the proposed RAZAR system Table 3 and Fig. 4. Existing models use the methods described in Chapter 4 and validated by conducting focus group discussion consisting of Zakat experts from BAZNAS of South Tangerang, Zakat experts from Post Graduate Schools of Syarif Hidayatullah Jakarta State Islamic University, experts in making Zakat IT systems from LAZ Dompet Duafa and experts the establishment of a system from the Syarif Hidayatullah Jakarta State Islamic University. There are 3 main items related to the proposed model that is built the first is the use of community models (community involvement) to search, to collect and to recommend Mustahiq data processes. Second, the SOA Model for integration between LAZ systems and other

Table 3: Proposed model formation

Problem (#)	Proposed model of RAZAR application
There is a significant difference between the funds raised and distributed	The systemcan detect the presence of Mustahiq candidates in real time using Google Maps by involving the public (recommendation system) A system was created can provide information on the existence of Mustahiq to Muzakki who wants to donate his Zakat directly using Google Maps
The relationship between Zakat recipient institutions in a system has not been integrated	The system can provide services (in the form of web services) to Zakat institutions to be able to share data with Mustahiq candidates, verify data on Mustahiq candidates to become Mustahiq by using Service Object Architecture (SOA) technology
Mustahiq and Muzakki data are still very limited and seem difficult to be obtained	The system involves the community to recommend each other if there are neighbors or families that really need ZIS
Here are still many Muzakki who give Zakat without going through the Amil Zakat institution	The system still bridges the desire of the community to send Zakat directly to the community by involving the Amil Zakat institution indirectly
The high operational costs in the Zakat collecting process	The system allows people to collaborate in recommending Mustahiq candidates, making them accomplices of BAZIS and LAZIS. The recommendation as well as the use of Google Maps to be able to detail the position of the Mustahiq candidate

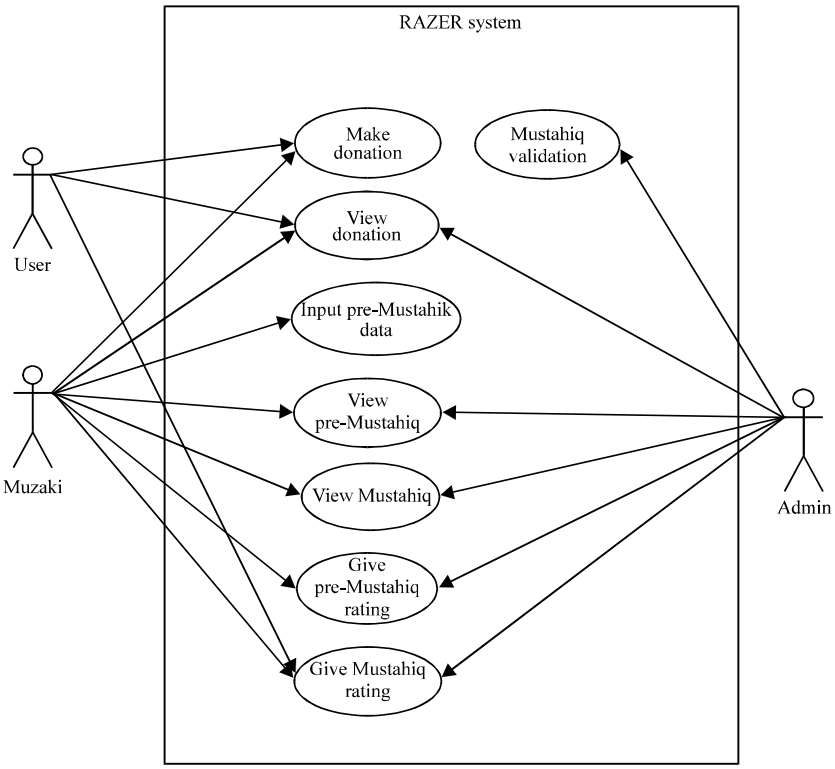

Fig. 4: Use case diagram of RAZAR system

Table 4: Design example of RAZAR application webservice

Name of API	API descriptions
Details of Mustahiq candidate	This API contains the Mustahiq candidate details that have not been validated, if the user wants to use this API please enter the Mustahiq candidate ID first to see the details of the Mustahiq candidate data
List of Mustahiq candidates	API which contains all Mustahiq candidate data that has not been validated by the Amil institution
Mustahiq list	This API contains all Mustahiq data that has been successfully validated

systems that can support the Zakat program. The three models that use digital map technology for the search process and data collection.

The usage of community models: The community model built involves various elements involved in the Zakat eco system. These elements include people who are in the environment as extended arms from LAZ, LAZ itself as the candidate validator Mustahiq to be Mustahiq. This is in line with the way BAZNAS works that try to involve mosques as UPZ (Saputra, 2017) as an extension of the BAZNAS. In this study, every community can become an extension of the hands of BAZNAS in terms of data collection of Mustahiq candidates, provide recommendations and reviews of Mustahiq candidates Fig. 4. This data collection from the community for the poor can also be seen by the LAZIS and BAZIS communities, so that, they can help accelerate these institutions in relation to the search for Mustahiq data which is an issue of the problem of data collection of Mustahiq candidates.

The use of community models can also increase the level of trust of Zakat stakeholders, especially, Muzakki who will donate funds. The trust model will be formed because of the mutual reminding of the community regarding the status of Mustahiq candidateor Mustahiq to be assisted. This model is in line with several previous studies such as Imani *et al.* (2017), Sidharta and Suzanto (2015), Ryan and Deci (2000) and Parasuraman *et al.* (1985) with the use of recommendation and review models where each community can play a dual role as a recommendation and also a supervisor. The recommendations that will be made for the RAZAR system use a Likert scale which starts with giving one to five stars.

In the proposed model, each data collection, recommendation and review from the community becomes data for LAZ. LAZ can then verify the data and can change the Mustahiq candidate status to Mustahiq. Every Mustahiq that has been validated by one or more LAZ will appear on the system, making it easier for Muzakki to give their donations by filtering by location where Muzakki can then give the donation directly to Mustahiq that has been validated. This process was proposed as a bridge to the solution of the problem related to the number of Muzakki who donated directly to Mustahiq (problem No. 4). With this model, Muzakki can still provide directly but on the other hand this donation is recorded in one LAZ, so, this is one solution for some existing problems (problems No. 1, 3 and 4). There is a record of the results of the FGD conducted there was one FGD participant from the South Tangerang BAZNAS who said in the discussion that:

> In my opinion, not all Mustahiq candidates or Mustahiq want their data to be published into the system. This is due to some Mustahiq want to keep their status secret and assume that this is part of self-esteem as human beings

In order to bridge the above opinion, other discussion participants agreed that a middle ground must be sought related to the need for search, data collection and direct distribution by the community to Mustahiq, so that, in designing the existing module there is one field that requires the recommendation to ask the Mustahiq candidate whether the data can only be accessed by LAZ or can be accessed directly by the community.

Model of Zakat systems integration: In order to connect the relationship between the systems built with the existing BAZ and LAZ systems we created several webservices that could be utilized by BAZ and LAZ. Integration using this web service has been widely used and recommended by several researchers such as Iskandar (2015), Mahmoud *et al.* (2015). He and Da Xu (2014) and Thu and Aung (2015) with a process that does not change the existing system. The main purpose of the service is to provide information related to the Mustahiq candidate that has been recommended by the community, list of Mustahiq which has been validated by BAZ and LAZ and the list of Muzakki. Details related to the sample webservice created can be seen in Table 4.

The integration mechanism built can connect tow different systems, first is an android-based mobile system. This application will use will send data to the web-based system using JSON which will then be saved into the database which we call the proxy database. It was called a proxy database because this database as a proxy can be used by the BAZIS and LAZIS systems. This webservice design will be intentionally opened for BAZIS and LAZIS by providing URLs that can be accessed by these institutions (Fig. 5). After this integration model was offered to the FGD participants, the participants agreed that for now the integration related to Mustahiq data was

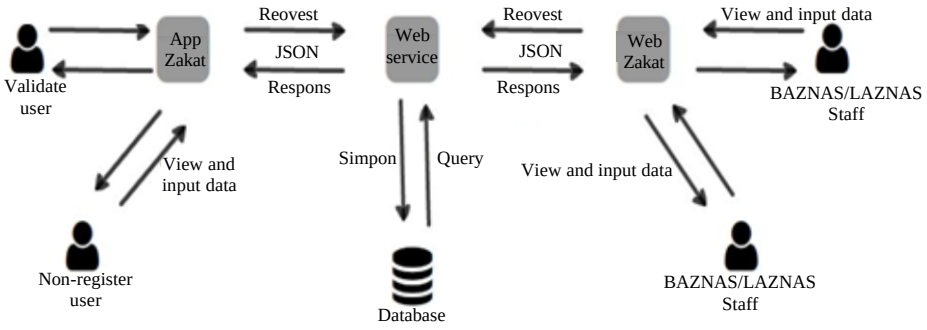

Fig. 5: RAZAR system webservice work pattern

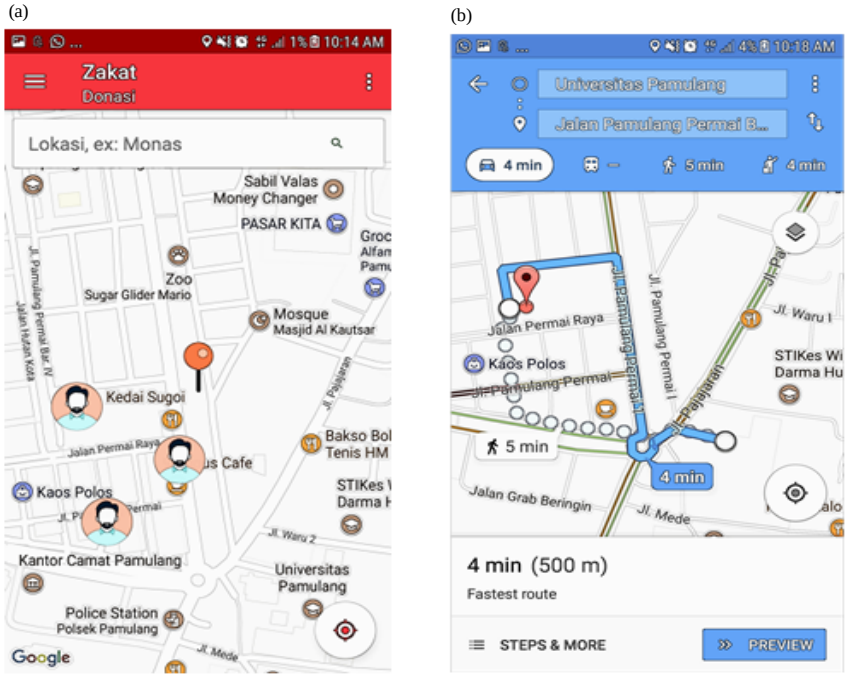

Fig. 6: Design of RAZAR interface: a) List Mustahiq and b) Map to Mustahiq

needed. While Muzakki data still became a debate as stated by one of the discussion participants from LAZ DD.

The problem of integration or data exchange between LAZ has already been discussed but there are confidential data that each LAZ will maintain the data. Data that is kept secret one of them is Muzakki data. As in the banking industry where every bank must keep its customer data confidential except to the parent institution that houses the bank, namely Bank Indonesia. For data related to Mustahiq it is expected that there is a neutral institution that can bridge the interaction, for example the universities.

The researchers became convinced that after getting input from FGD participants, the proposed data integration model was to exchange data between LAZ and limited only to Mustahiq data. With the existance of Mustahiq data integration, LAZ with their own advantages can cover each other and find Mustahiq needs. For example, there are LAZ who are engaged in community empowerment, so that, they can collaborate with LAZ which is engaged in the health sector to help Mustahiq who needs these two types of services. This integration process in the view point of researchers can solve problems related to data collection (problem No. 3) and a decrease in operational costs of Mustahiq data search (problem No. 5).

Model of Mustahiq data search: Data searching and collecting process of Mustahiq which was done by UPZ

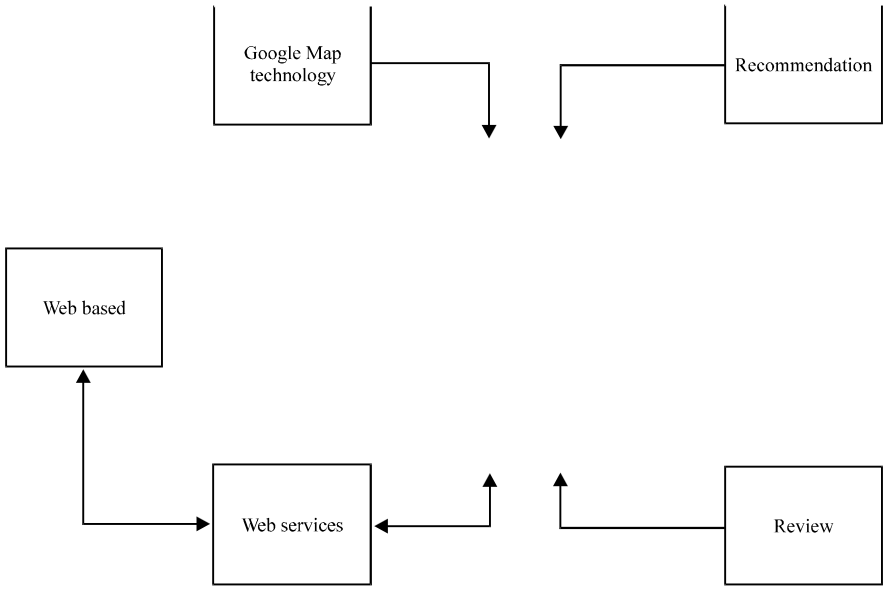

Fig. 7: System architecture

and the LAZ team need a better approach. One good category, here is being able to get the precise location. The approach of tracking the position of the Mustahiq in this study uses the approach done by Anindhita *et al.* (2016) and Amajida (2016). By using Google Maps, the recommendations can easily capture the coordinates of the home position of the Mustahiq candidate Fig. 6a. With this coordinates data, the Amil Zakat institution can go to the candidate's homes and validate Fig. 6b more quickly and precisely. The use of this digital map will make the user in this case Muzakki will be easier and more fun in using the RAZAR system this is in line with research that wants to know the perception of the use of applications that use digital maps as done by Weng *et al.* (2017). Since, Muzakki will easily know the position of Mustahiq that has been recommended by the community and validated by LAZ.

This was also one of the inputs from FGD participant from Zakat audit experts from the Ministry of Religious Affairs regarding the ease of technology. One solution to get fast Mustahiq data is with technology. Technology is also very much needed to accelerate the collection of Zakat funds from the Muzakki. An example is the online taxi community such as Gojek, Grab and Uber can be used as solutions for how they build ecosystems between users companies and taxi or motorbike providers. However, all solutions must still be able to refer to regulations related to Zakat itself as all Zakat efforts can be recorded through LAZ and BAZ.

This model is expected to accelerate ZIS uptake and reduce the gap between revenue and distribution increases (problem No. 1) by facilitating the existence of communities who are accustomed to directly giving their ZIS to Mustahiq. In order to achieve the amil institution's participation to be maintained the Muzakki who will give donations directly to Mustahiq through the application model that will be built will still choose the amil institution before donating.

In order to use digital map technology from this we use the Google Maps Application Program Interface (API) available on the Google play service. When the user wants to enter the candidate address data Mustahiq, the program will call the map function that has been provided by Google to take the name of the location, longitude and latitude. While at the time of donation, the program will take the location where the user is located using the get my location function provided by Google Maps. The Mustahiq data will appear on the map and symbolized by an icon where the Mustahiq location is of the Latitude and longitude that has been registered before (Fig. 6).

The proposed architecture of RAZAR system: Furthermore, from the list of existing problems by adopting the approach in the sub-chapter above we propose an architectural model as illustrated in Fig. 7. The architectural model built involves elements of recommendations, reviews and integration with other Zakat systems using web service and the use of digital maps. In order to be able to complete the model, several other functions must be created (Fig. 4). Furthermore, a needs analysis is conducted to get what modules are

needed by the RAZAR system. In this requirement analysis phase, the functional requirements and non-functional requirements will be defined. The proposed model in Table 4 is then used as a reference in obtaining functional requirements and non-functional requirements. The following are some functions that must be in the RAZAR application:

- Entering Mustahiq candidate data
- Seeing the Mustahiq candidate
- Giving donations
- Seeing the donation report
- Seeing the Mustahiq candidate
- Seeing Mustahiq data
- Giving rateto the Mustahiq candidates
- Validating Mustahiq candidates in to Mustahiq
- Do Mustahiq rating

The actors involved in this RAZAR system are users (as recommendations) admin (LAZ officers) and Muzakki. In order to be more understand who is using what module we can see more details in the use case diagram (Fig. 4). While for non-functional requirements in accordance with the above improvement system are:

- Using of mobile applications
- Using of the Google Maps API for location search
- Using of SOA technology for web services provided for communication with the BAZIS and LAZIS systems

CONCLUSION

This study proposes a new model in making Zakat information systems called the Radar Zakat system. The process starts from defining the problem by using the literature study and observation methods. The results obtained five main problems in the existing Zakat system, namely, the gap between the collection and distribution of Zakat, the system has not been integrated between LAZ, the data of Muzakki and Mustahiq are still very limited many people still enjoy donating directly without going through LAZ and fees the operation of some LAZ is quite high. Then look for the cause of the problem by using the interview method. Interviews were conducted on six Zakat experts from LAZ, BAZ, regulators and academics. There were four causes, namely, limitation of Mustahiq searching staff from LAZ, Muzakki who did not trust LAZ, regulations that were not all implemented and differences in budget years between LAZ programs and fiscal years.

RECOMMENDATIONS

The researcher analyzed the causes of the problem by comparing the other cases to get the right solution model. This comparison is carried out by conducting a literature study on similar case studies, so that, three main elements in the RAZAR Model are proposed, namely, community models among communities, the use of SOA Model in the integration between LAZ and the use of digital maps. Furthermore, the existing model is validated by conducting focus group discussion. The results show that the community model can help solve problems number 1, 3, 4 and 5. The integration model with the SOA approach can solve problems number 3 and 5 while the use of digital maps can solve problems No. 1 and 4.

This research still needs to be refined, especially, regarding the rules in Zakat, for example, may or may not Mustahiq data be seen by Muzakki directly. For this reason a more in-depth study is needed regarding the relationship between the models built with the law of Zakat. In addition, a system prototype is needed from the existing model and the level of success of using this system before it can be widely implemented in the community. The development of the Zakat information system is better designed in an enterprise, so that, a comprehensive Zakat reference model is needed.

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