Utilization of information technology for sustainable rural development

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Abstract. This paper presents the utilization of information and communication technology in a rural community in Indonesia, which experiences a development gap caused by structural constraints and lack of infrastructure. The paper based on field research by taking the case of a village called Mandalamekar in Tasikmalaya, West Java, which uses information technology as a tool of struggle for rural development. This study refers to the concept of sustainable rural development using case study research with data collection techniques in the forms of interviews, observation, and document studies. This paper discusses the society of using information technology and the variety of ITs applied in the rural development. Since the rural community took advantage of information technology, the acceleration of transformation took place on ability to build and operate the technology and media as its main tool. This paper proves that IT can be effective tools for sustainable rural development. IT not only influences how people interacts each other, but at the same time, it affects how people find mutual solutions for rural problems.

1. Introduction

Along with the development of information technology, Indonesian people scattered in thousands of islands ideally get access to information and voice various problems and aspirations. Information access for the Indonesian people is a process of public empowering by means of community self-reliance as a key to people's infrastructure development.

The Global Information Technology Report (GITR) series has accompanied and monitored ICT progress for more than a decade and raised awareness of the importance of ICTs for long-term competitiveness and well-being. Through the lens of the Networked Readiness Index (NRI), the driving factors and impacts of networked readiness and ICT leveraging have been identified, highlighting the joint responsibility of all social actors. The Global Information Technology Report 2014 features the latest results of the NRI, offering an overview of the current state of ICT readiness in the world. This year’s coverage includes a record number of 148 economies, accounting for over 98 percent of global GDP. In the NRI, Indonesia ranks 64th from 148 countries [1].

It can be said, globally, Indonesia is still at the "middle level" of ICT development. This condition is also similar for the Southeast Asian regions, because Indonesia is ranked 4th from all ASEAN countries [2].
Meanwhile, in 2012, the UN Conference on Sustainable Development ("Rio+20") called for identifying technology facilitation mechanism. The Addis Ababa Action Agenda, in its paragraph 123, decided to establish a technology facilitation mechanism. Technology, science and capacity building are major pillars of the Means of Implementation of the Post-2015 Agenda and of the Rio+20 follow-up processes. Therefore, in 2030 Agenda UN: Sustainable Development Goal (SDG) 17 technology, focuses on strengthening the means of implementation and revitalizing the global partnership for sustainable development technology. Target 17.7 stresses on "Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favorable terms, including on concessional and preferential terms, as mutually agreed" [3].

The use of information technology as a study has been carried out by many researchers, but in general it is mostly studied by engineering perspective. While research on IT in the social and humanities perspective is still very rarely done. Some of the studies that have been conducted include: the ICTs sector mapping inequality with the analyses of mapping between the productive populations level with internet usage among countries [4]; utilization of technology as a method of mitigation disaster [5]; the characteristics of the concept of sustainable development and how ICT relates to sustainable development with reviews a number of the ways leading ICT companies [6]; studied examines several ongoing projects that aim to provide IT-based services to rural populations [7]; The opportunities of ICT application in rural development are immense at the same time the government will also be facing some challenges [8]. Meanwhile, in this paper, the purpose is revealed the motive of the people of Mandalamekar Village to use IT as a tool for rural development, the kinds of IT products are used by them, and how then the IT has implications for a sustainable rural development process.

2. Research methods
Using qualitative method with a case study approach, this study will examine the Mandalamekar village. Mandalamekar village was chosen for their high acceleration in rural development, because using IT for development rised from rural community and local governance. Purposive sampling was employed in selecting sample. Ten peoples and local governances were involved in the research that included in-depth interviews and field observation. Document study were as a secondary data collection for complementary.

Utilization of IT related sustainable rural developments were identified and documented. The first phase is a collecting data process through interview and field observation, while the second phase is validating the data through document study to establish scientific base for utilization of IT for sustainable rural development. Qualitative data analysis is carried out interactively and lasts continuously until complete with a cycle model in the form of interactive model, consisting data collection, data reduction, data display, and conclusion steps.

3. Result and discussion
Most studies demonstrated that the rapid development of new IT has been the main force accelerating sustainable rural development [4-8]. However, little studies examined localization of IT in local-cultural context. In the case of Mandalamekar, it allows villagers to interact with multiple persons and equally participate in the decision making in the local context. Here, IT not only influences how people interacts each other, but at the same time, it affects how people find mutual solutions for rural problems.

Mandalamekar Village as one of the villages in Jatiwaras Sub-district, South Tasikmalaya, in West Java, Indonesia. The location of this village is 139.5 kilometres from Bandung City and 284.7 kilometres from the capital city of Jakarta. Before 2012, the road infrastructure to the village is still very minimal. So that, although Mandalamekar is ± 30 km from the centre of Tasikmalaya City, take up more than 2 hours instead of the one hour it should be with the distance between the village and Tasikmalaya city.

It is not only the infrastructure of roadwork that is a problem, but also the facilities for education in the village. Before 2014, the schooling in Mandalamekar was only up until the level of Junior High and only one public school was available, which meant that if students wanted to continue their studies, they...
had to move somewhere towards Tasikmalaya city. Mandalamekar village where is blank spot area, because there are in mountain area.

In spite of this, there has now been an interesting change in the Mandalamekar society with the emergence of an enthusiasm to progress. This phenomenon began with the appearance of the community radio in the village in 2007. The euphoria that overflowed from the people with their new community radio became somewhat of a stimulus in the community’s desire to develop their village.

Community radio is a product of information technology. Therefore, how then is information technology built and developed by Mandalamekar villagers become an interesting phenomenon, especially when this information technology is used as a tool to develop rural sustainability.

3.1. The motives of the Mandalamekar people to utilize information technology for development

Building information technology-based village is not the initial orientation of the Mandalamekar rural government. Actually, the problem in Mandalamekar village does not originate from the issue of Information Technology (IT). Structural issues are fundamental issues that make Mandalamekar until 2007 remain a backward village.

The use of IT is only a means of struggle for them to make shortcuts to be able to more quickly build and advance the village. This was motivated by village conditions that were still very poor in infrastructure before 2012, especially access of mobilization and an increase in the economy of the people who were not very supportive.

In 2000 the village head then consulted with residents to make village regulations that prohibit people from harassing harem land or village customary land. The regulation raised strong reactions from the community and the village head got pressure from the people living in the village and their migrants. The village head felt that he needed the media to conduct intensive socialization and communication with his community.

The reason why the village head was interested and then switched orientation to building an information system in the village was initially motivated just to state that this village exists, because when speaking Mandalamekar, outsiders, especially the government, did not know them. Then, how can village heads compete and get funding for development, while the government budget is insufficient. From that experience, the village head took a different step, taking steps in the utilization of IT.

3.2. The variety of information technology applied in the Mandalamekar village

In early 2007, the village head together with the residents established the Ruyuk FM community radio as a medium to voice the importance of conservation forests for rural communities. Ruyuk FM community radio stands and operates with the courage of the village head and residents, because it is run autonomously and no one has the technical skills of radio broadcasting. The broadcast equipment is operated by trial and error, even though it turns out that the device was incorrectly installed, but it can turn on.

The reason for choosing radio is because radio is a medium that is easily understood and close to oral traditions that live in the culture of the community, so it is possible to be carried out by villagers in the style of radio broadcasts that talk, such as chatting. The existence of community radio in the village brings a new spirit to the community. They felt they had their own radio made the community enthusiastic to make changes, including to build villages with their own resources and abilities.
Ruyuk FM later became a very important medium for community members to communicate with each other. Moreover, because the geographical conditions of the villages in the mountainous area with locations between villages are separated by hills and valleys, making it difficult for residents to communicate with each other. Community radio is a medium that is not only used as a medium for delivering rural government programs, but also as a medium of communication and community relations. The existence of the Ruyuk FM community radio in Mandalamekar Village has finally been used as "media in the village" to promote community communication.

Early in 2009 came the idea of people who migrated to the village to introduce the village via internet. It was assumed to be cheaper, while the delivery of the message was wider, not only reaching the district, local or national, but global level. That Mandalamekar could be better known and known about the condition of his village. Mandalamekar will also be known by the outside region. Finally, in 2009 using the free internet facilities made a village blog with the name "mandalamekar.wordpress.com."

From there the first milestone, Mandalamekar began to be integrated with the "outside world". The village blog is also a medium to treat the homesickness of the villagers who migrate because they know the current conditions of their village. Along with the development, various writings showing the development programs carried out in the village made some migrant young people begin to be interested in returning to the village. There is a very significant change in the existence of the blog, because it grows the imagination of the people who migrate that there is an opportunity to prosper in the village.

In 2010, when the Community Radio Network Member Forum (Musang) West Java was held in Mandalamekar Village and visited by community radio activists, Indonesia Community Radio Network (JRKI) officials and several NGOs, one of IT experts offer the local government of Mandalamekar to improve their blog by creating a website, because the website is not only for managing information systems but also for managing data for the sake of improving the village administration system.

The village head agreed and registered to create a portal in the go.id domain. But, the go.id domain is only for government institutions to the district level, so that for the village level they cannot use it.
They were also advised by JRKI to make it on the or.id domain for non-government institutions. Finally, Mandalamekar village has its own port under the name "mandalamekar.or.id"

The benefits of building a technology-based information system began to be felt. Although at that time Mandalamekar was still a lagging village behind, attention had begun to emerge from the local government. In 2012 the West Java provincial government provided assistance by improving road access to Mandalamekar for 3 kilometers from the village border.

In 2012, the head of Mandalamekar and IT activists initiated the struggle for the desa.id domain, because using the or.id domain was inappropriate and did not have a clear identity. The struggle was strengthened by several serious discussions and advocacy until finally submitted to the Ministry of Home Affairs Republic of Indonesia. The struggle also achieved results on 1 May 2013 with the launch of the desa.id domain at the Jakarta Monas Square. At that time, Mandalamekar became the first village to use its name as a village portal: "mandalamekar.desa.id."

The phenomenon of change in the community by utilizing information technology has resulted in a transformation that has implications for sustainable rural development. Experts believe that the presence of computer technology and new media is producing fundamentally new forms of society. Now with the transformation of information, Mandalamekar is building a new form of community. The use of technology-based communication channels is an effort to be able to interact easily between members of the community, even though separated by slopes and valleys. With technology, the people of Mandalamekar can share information and interact more quickly with more people.

According to United Nations and G8 group of industrialized countries flagged Information Communications Technology for Development (ICTD) as a global development priority in 2000, the understanding of ICTD as a core development issue has been rapidly evolving. ICTs are basically information-handling tools – a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include the “old” ICTs of radio, television and telephone, and the “new” ICTs of computers, satellite and wireless technology and the Internet [9].

In the 1987 Brundtland Report, “Our Common Future,” was formulated a concept “sustainable development” as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [10]. Rural Development (RD) aims at improving rural people's livelihoods in an equitable and sustainable manner, both socially and environmentally. RD has to combine economic, social, and environmental policies with the idea that resources must be available for future generations. In this sense, there is an opposition between growth, understood simply as an economic increase, and sustainable development that considers quality of life, appropriate use of resources, and environmental protection more important than GDP [11].

Sustainable rural development is vital to the economic, social and environmental viability of nations. It is essential for poverty eradication since global poverty is overwhelmingly rural. The manifestation of poverty goes beyond the urban-rural divide, it has sub regional and regional contexts. It is therefore critical, and there is great value to be gained, by coordinating rural development initiatives that
contribute to sustainable livelihoods through efforts at the global, regional, national and local levels, as appropriate. Strategies to deal with rural development should take into consideration the remoteness and potentials in rural areas and provide targeted differentiated approaches [12].

4. Conclusion
Social and economic development of the society in the 21st century is increasingly by the use of IT that are right for the local community’s need. The use of information technology that fits the needs of the community can empower the community and support sustainable village development. This paper presents the Mandalamekar case in West Java, where local actors work together to use information technology to overcome obstacles and open access to their villages. Despite efforts to increase the capacity of IT use in the village are still ongoing, it is an interesting phenomenon that technological advances do not always conflict with the culture and values of local community. In fact, here IT can be supporting the process of sustainable rural development.

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