Exploring the Needs of Electricity in Indonesian Rural Area: A Community Readiness Model Approach

Abstract: The seventh Sustainable Development Goal seeks inexpensive, reliable, sustainable, and modern energy for everybody. It implies that people deserve lights and power. Energy shortages have been linked to health, productivity, and education issues. As energy shortages become a societal issue, communities must be ready to solve them, which often referred to ‘community readiness’. The level of social interaction within a community can impact its readiness to solve several issues in the community. Cooperation within communities can boost welfare outcomes. Thus, this study investigates how social interaction and community readiness affect community welfare in a non-electricity neighbourhood. In this study, the researchers employed a mixed-method approach to gain a comprehensive understanding on the case under study. A semi-structured interview to key informants and a non-participatory observation was conducted to obtain the qualitative data. In addition, a survey to the community was also performed. The findings show that the social interaction and the community readiness were not able to increase the community welfare, both directly and indirectly. On the other hand, the finding also showed that social interaction among the people encouraged the readiness of the community in accepting access to electricity in their environment.

Keywords: Sustainable, Development, Social Interaction, Community Readiness, Community Welfare, Electricity.

I. INTRODUCTION

The term ‘community’ is often described as a group of people who share a specific geographical area or a common threat for certain activities [1,2]. For instance, people who work in the agricultural field, i.e., farmers, tend to join a community in order to get updated information, i.e., existing price of their agricultural products, prior sending them to the market. Thus, by joining a community, individuals gain assistance in fulfilling their interest [3]. In the community, these individuals communicate, engage, and interact with one another within a social or communal context. These activities are often referred to a social interaction [4]. Indeed, social interaction is arguably playing a significant role in enhancing community welfare. It is argued that social capital, i.e., social interaction, is one of the essential aspects of community welfare [5]. The concept of community welfare itself recognizes that the welfare of individuals within a community is interconnected and influenced by the collective well-being of the community as a whole.

Energy plays a vital role in community welfare, impacting various aspects of people’s lives. Energy is a driver of the economy and a prerequisite for development. Sufficient and affordable energy availability can support the fulfilment of basic needs such as food, healthcare, and quality education, which in turn supports human development. However, the lack of energy has been claimed to have multidimensional effects on various development indicators, such as health, productivity, and education [6].

Over the past 10 years, the production of crude oil in Indonesia has shown a declining trend, from 346 million barrels (949 thousand barrels per day) in 2009 to approximately 283 million barrels (778 thousand barrels per day) in 2018 [7]. The causes include, among other things, the aging wells in Indonesia. In general, the absence of energy can limit access to communication services and the internet, which can affect social interactions and relationships.

Several studies have examined the relationship between social interaction and community welfare, shedding light on the various factors that influence the relationship. For instance, found that increased cooperation within communities can lead to improved welfare outcomes. Also, the significance of community involvement in promoting welfare outcomes was also discussed by [8] who emphasized the importance of community...
engagement in addressing social issues. Therefore, it is argued here that addressing the lack of energy from a various perspective to improve community welfare is important.

In regards to dealing with problems in the society, the community needs to have the capacity to address specific issues, opportunities, or challenges, which this capacity often referred to community readiness. The level of social interaction within a community can impact its readiness to solve several issues in the community. Prior studies have explored the relationship between social interaction and community readiness. For example, [9] argued that social interaction and shared contexts within a community can influence its readiness to address specific issues. On the other hand, [10] suggest that social interaction and community engagement are essential factors in determining readiness for specific interventions. It can be argued here that effective social interaction within a community can contribute to its readiness by encouraging communication, collaboration, and a sense of shared purpose. On the other hand, a community that is well-prepared and ready to address issues is more likely to have effective social interactions that support its goals and objectives.

The implementation of Law Number 30 (2009) on electricity, which has been amended by Law Number 11 (2020) on Job Creation, in order to achieve equitable development and improve the electricity infrastructure that supports economic growth and access to electricity for the well-being and quality of life of the population, as well as to support the achievement of key performance indicators for the West Java province, such as electricity consumption per capita, a supply of electricity to the community is needed. The significant role of electricity in increasing productivity is indeed can be found in the society. For instance, the use of electricity in hydroponic farming in Surabaya, East Java, was proven can enhance the harvest time to becoming faster, which then offer a positive impact to the welfare of the community.

Listrik Mandiri Rakyat (Limar) is one of the independent programs initiated by Ujang Koswara, a resident of West Java Province that involves and empowers the community in meeting their electricity needs. The Limar lighting program has been implemented by the Department of Community Empowerment (DPM-Desa) in West Java. However, the ongoing issue of lacking access to electricity in many areas in West Java province remains unresolved. This problem specifies how the seventh sustainable development goal (SDG 7) has not been achieved. Furthermore, involving the community with a community-based approach in meeting their electricity needs in their own areas has not been widely explored or documented in previous research. Therefore, this research aims to explore the key issue in the community regarding the accessibility to the electricity. Also, this study seeks to examine the relationship of social interaction and community readiness in promoting the community welfare regarding the case under study.

ILLITERATURE REVIEW

The Community Readiness Model (CRM) is commonly known as a valuable approach that can be used to examine the readiness of a community in addressing specific issues and promoting community welfare [11]. Thus, it can be said that assessing a readiness in a community must be issue-specific and community-specific. According to the community readiness theoretical model is constructed on four underlying arguments. First, each community may be at a different stage of readiness when dealing with a specific problem. Second, the level of readiness of the community can be accurately assessed. Third, communities can be progressed through a series of level to develop, implement, maintain and improve effective programs. Fourth, it is essential to identify which stage of readiness does the community belongs to, because the action to bring communities to the next stage is different for each level of readiness.

The use of CRM in prior research can be found in several literature. For instance, used CRM model to assess the community readiness to promote social and emotional health among the children. The study interviewed key informants to capture their level of community readiness in addressing the case under study. Meanwhile, [12] found in their study using the CRM model that social interaction and support contribute to individuals’ readiness for work. Social interaction is argued to be significant in facilitating the exchange of information, ideas and resources among community members that can contribute to the development of collective action and readiness for change.

Based on the previous study mentioned above, it can be said that there is a relationship between social interaction and community readiness. However, there is no evidence can be found in prior research in assessing a relationship between social interaction and community readiness, specifically in the context of community readiness in one of the villages in Indonesia. Thus, it can be stated here that the first hypothesis is:

H1. Social interaction has a positive effect on community readiness
‘Welfare’ can be explained in general as a condition in which the basic needs, for both material and non-material needs, of an individual or a community are fulfilled. The role of community is vital that it can promotes community welfare. According to [13], community welfare refers to the well-being and quality of life of the community members. The goal of a welfare is commonly measured based on a certain measure that includes economic, social and other measures [14]. To meet the welfare, the community members need to collaborate to identify common goals, mobilize resources, and advocate for change [15].

It is critical to consider the relationship between community readiness and community welfare. Prior study showed that there is a positive relationship between the stage of community readiness to community characteristics and the development of tourism [16]. Therefore, it can be hypothesised in this study that:

**H2. Community readiness has a positive effect on community welfare**

Several prior studies showed a relationship between social interaction and community welfare. For instance, [17] argue that to ensure community welfare and empowerment, it requires interactive interaction between individuals, the community, organizations and broader social and political actors. They claimed that community welfare is a collaborative process that require the active involvement and cooperation of different stakeholders. Their findings underline the importance of social interaction and collective action in promoting community welfare. Meanwhile, [18] emphasised the positive effect of philanthropy on social interaction and community welfare. They advised that generosity and donations from one to another can enhance community welfare. In conclusion, it can be said that there is a positive relationship between social interaction and community welfare. Therefore, it can be hypothesised that:

**H3. Social interaction has a positive effect on community welfare**

Prior research has shown that social interaction can affect community welfare through the concept of community readiness. For instance, [19] suggest that communities with higher level of readiness, which may be influenced by social interaction, are more likely to have better welfare, i.e., health outcomes. It means that the role of community readiness as a mediator can affect the relationship between social interaction and community welfare. In conclusion, community welfare is a notion that require a comprehensive approach. The role community readiness and community organizing are essential elements in promoting community welfare. It is argued here that engaging community members through social interaction and assessing the community readiness can improve the overall of community welfare. Therefore, it can be hypothesised that:

**H4. Social interaction affects community welfare through community readiness**

### II METHODS AND MATERIALS

#### A. Study design

Community Readiness Model has been claimed to be an effective tool in capturing the community perspective and facilitating the community-tailored intervention strategies [20]. It is commonly used to provide insight into how communities are ready to address issues. The model is considered as a part of mixed-methods approach that combine readiness scores and qualitative items [21]. Although scholars are concern about quantification of the qualitative data, providing scores combined with qualitative analysis are advised to deepen and contextualised the scores. Therefore, this study uses an embedded mixed-method approach, which the used of quantitative data would be dominant and the qualitative data obtained would mainly be used to support the quantitative results.

#### B. Data Collection

The qualitative data is collected using a semi-structured interview and a non-participatory observation. While a survey to the respondents were added during the field research activity to complement the qualitative approach. The researchers in obtaining the data for both qualitative and quantitative approaches used a concurrent method. To collect the data at the same time, the researchers had assistance from four university students. The assistants were responsible for distributing the questionnaires to the community. While the assistants managed the surveys, the researchers conducted all interviews.

The participants for the study were selected based on the richness of information provided and their understanding of the case under study [22]. Thus, based on the criteria, a purposive sampling approach was used to choose the key informants for this study. The five key informants were the head of the community, the urban village secretary, two senior citizens in the community and the business owner of a home-made electricity entity (Limar) (see Table 1).
Table (1). Key Informants

<table>
<thead>
<tr>
<th>No</th>
<th>Participant</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head of the community</td>
<td>KP1</td>
</tr>
<tr>
<td>2</td>
<td>Business owner (Limar)</td>
<td>KP2</td>
</tr>
<tr>
<td>3</td>
<td>Urban village secretary</td>
<td>KP3</td>
</tr>
<tr>
<td>4</td>
<td>Senior citizen</td>
<td>KP4</td>
</tr>
<tr>
<td>5</td>
<td>Senior citizen</td>
<td>KP5</td>
</tr>
</tbody>
</table>

**Source:** Participants during the fieldwork study

These key informants were asked to give a comprehensive response on the case under study. The questions developed for the interview are designed to answer the research question. The interview outlines are as follows:

Table (2). Interview outlines

<table>
<thead>
<tr>
<th>No</th>
<th>Interview</th>
<th>Participants</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What are the benefits of electricity?</td>
<td>All participants</td>
<td>QW1</td>
</tr>
<tr>
<td>2</td>
<td>What problems that may surface when electricity is available in the community?</td>
<td>All participants</td>
<td>QW2</td>
</tr>
<tr>
<td>3</td>
<td>How were the existing conditions in the community when electricity was absent?</td>
<td>All participants</td>
<td>QW3</td>
</tr>
</tbody>
</table>

**Source:** Prepared by the author, (2024)

Besides using a semi-structured interview, the researchers also employ a nonparticipant observation approach to experience the participants’ behaviour in responding the questions. The findings during the observation helped the researchers in gathering meaningful and contextual information on the case under study [23]. At the same time, the research assistants distributed questionnaires to survey 66 participants from a village in Karawang regency, West Java Province Indonesia.

C. **Data analysis**

The researchers used a manual thematic analysis in interpreting the interview data and meeting the research’s objective. On the other hand, the data analysis for the quantitative approach comprises two sections. The first part is a descriptive-statistics analysis. The descriptive statistics provide the participants’ demographic in the survey. While the second part is using the Structure Equation Model (SEM) – Partial Least Square (PLS) analysis. The model developed from the quantitative data complements the qualitative analysis in answering the research question.

**IV. RESULT AND DISCUSSION**

The findings in this research are presented in two sections, comprise the quantitative and qualitative results. The qualitative findings were embedded into the quantitative results to supplement the analysis and meet the research objective.

A. **Quantitative results**

The demographic characteristics in this study portray the respondents’ characteristics, gender, and educational level. This information is gathered from the participants so that the researchers obtain a detailed description of who participated in the survey and whether a case can be made for generalisability of the samples to a larger population [24].

There were 66 respondents who participated in the survey. The respondents were varied into three different age group, such as 17-30 years old, 31-50 years old and more than 50 years old (see Table 3). Those who were categorized in the group age between 17 and 30 years old were 23%. While 52% were at the range of 31 and 50 years of age, and roughly 26% of the respondents were more than 50 years old.

Table (3). Respondent’s age

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 – 30</td>
<td>23%</td>
</tr>
<tr>
<td>31 – 50</td>
<td>52%</td>
</tr>
<tr>
<td>&gt;50</td>
<td>26%</td>
</tr>
</tbody>
</table>

**Source:** Prepared by the author, (2024)
Next, females dominated the respondents who participated in the survey by 71% compared to the males with 29% (see Table 4). While seeing the respondents’ education level, it can be concluded that the majority (59%) of the respondents had completed elementary school (see Table 5). While those who had passed the senior high school level were only 9% of the total respondents.

Table (4). Respondent’s gender

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29%</td>
</tr>
<tr>
<td>Female</td>
<td>71%</td>
</tr>
</tbody>
</table>

Source: Prepared by the author, (2023)

Table (5). Respondent’s education level

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uneducated</td>
<td>14%</td>
</tr>
<tr>
<td>Elementary School</td>
<td>59%</td>
</tr>
<tr>
<td>Junior High School</td>
<td>18%</td>
</tr>
<tr>
<td>Senior High School</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: Prepared by the author, (2024)

B. Structural model evaluation

The outer model and inner mode have both been completed. The t-statistics returned from the Warp PLS program are then analysed to get the following result for a hypothesis test:

Table (6). Direct & Indirect effect

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>P-Value</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI → CR</td>
<td>0.651</td>
<td>&lt;0.001</td>
<td>0.423</td>
</tr>
<tr>
<td>SI → CW</td>
<td>0.105</td>
<td>0.191</td>
<td></td>
</tr>
<tr>
<td>CR → CW</td>
<td>-0.147</td>
<td>0.108</td>
<td></td>
</tr>
<tr>
<td>SI → CR → CW</td>
<td>-0.095</td>
<td>0.131</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Source: Prepared by the author, (2024)

Table 6 shows a significant connection between Social Interaction and Community Readiness. As a result, H1 is acceptable. In contrast, the result shows that there is no significant connection between Social Interaction and Community Welfare, Community Readiness and Community Welfare, and Social Interaction and Community Welfare through Community Readiness as well. As a result, H2, H3 and H4 are not acceptable. These values are compared with standard figures as follows: R-square < 0.02 (weak), R-square > 0.15 (moderate), and R-square > 0.35 (strong). The construct of predictive determination for Social Interaction and Community Readiness is strong, but for all model is weak.
Based on the quantitative findings, when it comes to the electricity instalment plan in the community, social interaction can promote the readiness of the community in accepting electricity network instalment in their environment. It is also expected that the social interaction and the readiness of the community in accepting the instalment of electricity in their environment can promote the welfare of the society. However, the model showed a contradictive result. Indeed, the findings show that the social interaction and the community readiness concerning the electricity network instalment in the community are not able to promote the welfare of the people, both directly and indirectly. It is argued due to the local people do not have access to the electricity completely. Thus, they have not experienced the positive impacts of having electricity in their environment. The findings also show that social interaction among the people encourages the readiness of the community in receiving the electricity installed in their environment. Furthermore, the people are currently waiting for the instalment of the electricity in their environment, which is expected can improve the welfare of the society.

C. Qualitative results
The participants were given questions using a semi-structured interview approach to explore their perspectives on the case under study. At first, they were asked to explain the benefits of having electricity if it were installed in their environment (QW1). Positive responses surfaced during the interview.

“…if electricity is present, housewives can be very happy as it helps them in doing their activities at home and it can also facilitate the children in doing their homework at night…” (KP1)

The statement from the head of the community (KP1) fitted with what the urban village secretary (KP3) who said:

“…I think we all can benefits from electricity. I cannot imagine a day without access to electricity… I mean look at the area here. We live just nearby industrial areas where electricity is essential. But, just a couple of metres from these factories, there are still people who have no access to electricity… (KP3).

Also, as the owner of LIMAR, Mr. Ujang (KP2) explained shortly how electricity is essential for human being.

“When I came to this area, I was quite amazed how can these people survived all these years without access to electricity. I mean, if they have some health issue at night, it is difficult for these people to go to the hospital as the streets here are very dark. No light at all at night. Also, network for mobile phone is not available. It is difficult for them to get connected to the outside world. It seems that they are isolated even though their area is surrounded by many big firms…” (KP2).

Secondly, the participants were asked to give their opinions on the possible problems that can be appeared in the community (QW2). All respondents gave an optimistic response denying the problems that may surface when electricity is available in their house.

For instance, the head of community (KP1) argues that:

“We look forward to getting electricity in our neighbourhood. Something that we are waiting for a long time. I believe that the people would be very happy.” (KP1)

The response above also confirms the level of community readiness in accepting the electricity in their house. In a different place, the secretary of the urban village (KP3) also expecting that the government can provide electricity immediately.

“I think the problems that the community is having is because they do not have access to electricity, So, I do not see problems will appear if the electricity is there”. (KP3).
He argued that the current condition, i.e., when electricity is absent, is the main factor that causes problems, such as, health, social and economic issue. Thus, he did not see problems may appear if electricity is accessible to the community.

Indeed, the two senior citizens (KP4 & KP5) were more than excited if electricity can be available in the neighbourhood. They mentioned some of the health issues that commonly appeared when electricity was absent. “Some of the children in the neighbourhood were having problems with their eyes. I think it is because of the lack of light at night when they need to do their homework. Also, the mothers also having difficulty when they need to cook the foods at nighttime. So, I think those problems can be solved when electricity is available. Not the other way around”. (KP4)

Next, the participants responses when they were asked on the existing condition when electricity was not available in the community (QW3) had confirmed how health, social and economic problems were often surfaced in the community (see QW2). The respondents (KP1, KP2, KP3, KP4 and KP5) agree that having access to electricity can help increase their quality of life. They also believe that the existing health, social and economic problems in the community can be solved if the access to electricity is available.

The responses from the interview have shown how the community is expecting to experience a welfare, as described by as the quality of life, which the community has been longing for a very long time. Since the lack of access to electricity has become an unresolved issue to the community, the community members understand that they need to be together in solving the problem. Thus, when the researchers conducted the fieldwork study in the village, all community members voluntarily participated in the survey and welcomed the research process.

The social interaction among the community members can also been seen when the researchers observed the setting. When the members were randomly asked on the electricity access, it can also be seen on their gestures how they expect it to be available immediately. The interview responses and observations confirmed the quantitative findings where the social interaction and community readiness are connected to one another. However, it cannot be found in the study how the welfare is attained as the community members have not experienced on accessing the electricity. Thus, it can be said that access to affordable, reliable and sustainable and modern energy as stated in the seventh sustainable development goals (SDG 7) is currently unavailable for the community members at one of the villages in Karawang regency, West Java Province Indonesia.

V. CONCLUSIONS

Access to energy, i.e., electricity, is the right for every human being. The Indonesian government is making efforts to address fundamental issues in society, especially in meeting the electricity needs for the society. However, due to the limited resources available to the government and the vast areas that need electricity supply, active participation from both the community and industry is required to help provide electricity in areas that are not yet electrified. In regards with the active participation of the community members, the head of the community has shown great endeavour in inviting the government to provide electricity in the village. Also, when interviewed were conducted, the community members have shown their ‘readiness’ in accepting the electricity in their houses. However, political factor is argued to be the main issue that hold the electricity accessibility by the community members. Apart from that, the social interaction and the community readiness concerning the electricity availability in the community found in this study are not able to promote the welfare of the people, both directly and indirectly. The reason may be caused by the lack of experience of the community members in having the electricity in their houses. Thus, the impacts of having electricity could not be verified. Future studies can be developed by considering the limitations found in this research. For instance, this study explored a specific issue in the Karawang regency, West Java, i.e., difficulty in accessing electricity, which required to be solved. Indeed, the problem of having electricity is also available in other regions in Indonesia. It means that capturing more areas as comparative study may provide a comprehensive analysis on the case under study. Also, the interview with the policy maker, i.e., the government, is required for future study so the researchers can understand the fundamental issue of the case under study.

REFERENCES


