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Community empowerment through appropriate technology: sustaining the sustainable development

Corinthias Pamatang Morgana Sianipar^{a,b,*}, Gatot Yudoko^a,
Akbar Adhiutama^a, Kiyoshi Dowaki^b

^a*Institut Teknologi Bandung, Jl. Ganesha 10 (Gedung SBM-ITB), Bandung 40132, Indonesia*

^b*Tokyo University of Science, 2641 Yamazaki, Noda-shi, Chiba-ken 278-8510, Japan*

Abstract

Rural communities are the major entities in developing and third-world countries. While outsiders want to develop local community, they should develop the local conditions and sustain the result. In order to get sustainability among rural communities, technology become a booster to reach it. However, the success rate of many community development projects result only compare between “before” and “after” condition of technology implementation. Furthermore, when its result reaches sustainable condition of community development, many communities can not further maintain as well as develop their sustainable development because low level of empowerment. This paper attempted to develop conceptual framework how to reach the sustainable development in a community which was strengthened through the implementation of appropriate technology in order to reach empowerment. The framework will be constructed through literature survey and then combined with several sample cases to provide a comprehensive discussion. This paper concluded that empowerment was the next shape of sustainable development. Three stages of community development were revealed. Appropriate technology can be positioned as the bridging point in reaching empowerment of rural communities. By looking at previous efforts which treated sustainable development as the final purpose of community development projects, this paper gave new lights how to reach beyond it. Empowering rural communities, sustaining their sustainable development.

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Keywords: Community empowerment, community development, sustainable development, appropriate technology

* Corresponding author. Tel.: +62-813-285-87187

E-mail address: morgana.sianipar@sbm-itb.ac.id ; morgana.sianipar@gmail.com

1. Introduction

Community empowerment had been proven to be a powerful approach for solving many community problems [1]. The critical point of many community development projects is about the mindset of outsider in their efforts to develop rural communities. Projects are subjected to get a better local condition, but only few efforts to ensure the sustainable development. While outsiders want to develop local community, they should develop the local conditions and sustain the result. However, when the results reach sustainable condition of community development, many communities can not maintain their sustainable development because the low level of empowerment. Ferguson [2] stated that empowerment is categorized as transformation process of a community. In order to fasten the process, technology is always needed to bring multiplier effect for the transformation process [3]. Many governments, business, and community in developed, developing, even in third-world countries always continuously attempt to develop technologies that are efficient and fit within local fiscal limitations [4]. Long time ago, Teitel [5] stated that developing and third-world countries have been quite concerned with the problems which is caused by technology introduction and acquisition in community development, a condition which is still exist today. However, the success rate of many community development projects result only compare between “before” and “after” condition of technology implementation. Because of that, the opportunity in implementing appropriate technology in community development projects need to be widened to reach beyond sustainable development, how local communities can maintain their sustainable development by themself and reach empowerment. Therefore, this study will answer following research questions:

- RQ1** What kind of technology that can be applied to solve community problem in reaching empowerment?
- RQ2** What is the appropriate conceptual framework that can be adapted to transform community development into community empowerment?
- RQ3** What efforts to outsiders do to sustain the sustainable development of rural communities and reach empowerment?

2. Literature Review

2.1. Community Empowerment

Empowerment should be the ultimate goal of any community development projects. While development often interpreted as the flow of resources from outside into community, empowerment push-and-pull full participation of all community members to change their world by themself, from inside to outside [2]. Speer and Hughey [6] concluded that community organization is an important way to reach empowerment. They stated that it is tightly related to the ecology of local community, how any outsiders must pay attention to the psychological condition of community in order to reach social power as the predecessor of empowerment.

As the efforts in sustaining the development in community empowerment project, Sianipar and Widaretna [3] have tried to develop new model based on triple-helix concept. The model was developed on the field directly to find the most comprehensive way in connecting three most important parties in community empowerment which are coordinated by NGO as the axis. Their model development was revolutionizing the way of collaboration between stakeholders.

As the main entity in developing countries as well as in community empowerment projects, community members behave as the business institution (B) of every production and trading process. The next party is university (U) which is represented by researchers. The researchers should come to community empowerment projects to apply their scientific knowledge into the application of appropriate

technology. The convergence of business and technology in terms of appropriate technology implementation could have such an effect on financial benefits, so the researchers' knowledge must be safely kept by the NGO through agreements. The purpose are any knowledges capitalizations must be applied only and directly by the community members, not by other commercial institutions. Furthermore, the government (G) join the triangle as the third party. Knowledge capitalizations need financial investment and supporting policy from government.

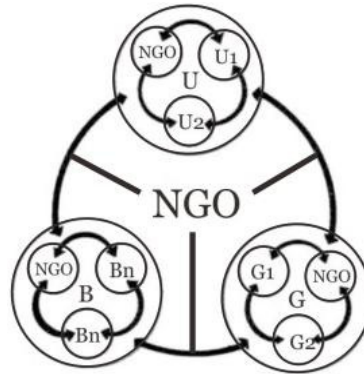


Fig. 1. Triple-helix model in a community empowerment project [3]

2.2. Appropriate Technology

Several researchers [7, 8, 9] had same intention to state that the cross claims between technologists about the weaknesses as well as strengths of their technologies are almost consist of prejudice, ignorance, or intolerance. The appropiateness of a technology then became big questions related to its implementation on the fields. In order to answer those questions, the keypoints of technology appropriateness can be seen based on the respected definition thoughts [10].

As the oldest and most referred thoughts, “appropriate technology” was interpreted as several integrated efforts in a product design or innovation development which include social and cultural aspects [11], and also called as a complete approach to do a self-adaptive development in dynamic conditions [12]. Their statement was based on the main purpose of appropriate technology: the users can afford the technology and also use relatively high technical system through the increase of their wealth and skills. In short, researchers who believe on appropriate technology approach concluded that the phenomena of appropriate technology emerge together with the specific conditions in a local area that need a technology which is appropriate with local people’s needs and wants [10].

On the other hand, the presence of appropriate technology also faced some critics from other researchers. The critics had same intention to state that appropriate technology may not be sufficient or good-enough from engineering perspective. Although from different eras, they similarly stated that it is conceited and naive to define any technological effort that improves capability to satisfy local community aspirations and goals [13].

2.3. Sustainable Development

Talking about community empowerment cannot be separated from the efforts for sustaining the development. The concept of sustainable development was significantly increasing over decades. Only from online records, the keywords “sustainable development” was featured on around 8,720,000 web

pages in 2005 [14] and now on around 198,000,000 web pages [15]. The most referred definition of “sustainable development” came from WCED [16 p.43]. They stated that “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” They rely it on the two key concepts. The first key concept “needs” meant overriding priority must be given to the essential needs of the world’s poor. The second key concept was stated as the meeting point of present and future needs through social organisation and technology to the environment’s ability beyond common limitations.

As explained by Sianipar and Widaretna [3], community members become the main business party in a community empowerment project, so the sustainability thoughts can also be traced from business perspective. Such businesses desired to change the world through social, environmental, and economic values [17, 18] which are called together as “triple bottom line” (TBL). On the other hand, the term “TBL” was referred as “people, planet, and profit,” with paralel thought to the first “TBL” term [19, 20, 21]. They gave notion that business area had been evolving in its understanding to encompass considerations of economic viability, environmental sustainability, and social responsibility as well [22].

Furthermore, Fisk [20] noted that businesses should find purpose beyond their profit maximization in order to reflect their concern on global future. As the nature of a business, economic side should be sustained through efforts in reducing costs, reacting more quickly to changes in the market, and increasing every process’ performance. However, it must –not only should– sustain the environment around the business entity. Some researchers have also tried to link environment with hazard mitigation issues [23], other ones connect it with heritage issues [24]. Markley and Davis [25] stated that environment issue become another performance-enhancing activity for business entity. Moreover, social issue become the last pillar for sustaining the development. Common business entities in industrial area often overcome social issues through their CSR programs. However, community members as business entities tend to hope that social issues are determined as the efforts for supporting their social goals [26]. It means that community choose to chase social welfare because of their nature to build relationship by each other [27].

Broader than those approach, Sianipar and Adhiutama [10] proposed three perspective in deciding the most appropriate technology in terms of increasing technology acceptance among community. While the world have same intention to see “green” issues as business discourse [28] that failed to focus because the exploitation related to their resources and people [29, 30], they proposed broader meaning of “green” from engineering perspective. “Green” as ultimate goal in environmental issue must be reached through the wider meaning of “technical” perspective. All efforts in sustaining the environment must not be built as only jargon or slogan, but must be applied as technical efforts to exactly measure the environmental impacts through technical assessments. That approach will ensure that “green” can be reached clearly.

2.4. Theoretical Framework

Community with lack of development must be developed through community development. Then, the increasing of knowledges will sustain the development. After that, the transformation process should be continued to reach beyond sustainable development, that is empowerment. As the booster of transformation process, appropriate technology should also be implemented through several stages in order to ensure the growth of effects of technology implementation. The stages should include the participation of three main parties in community empowerment projects, which also include existing appropriate technology as well as sustainable development thoughts into account. Because of that, the term “appropriate” should also be interpreted as the different level of appropriate technology for each stage. Moreover, even all three parties are participated in the process, the focus of all efforts must be directed to the community members as the main entity in communitiy empowerment projects.

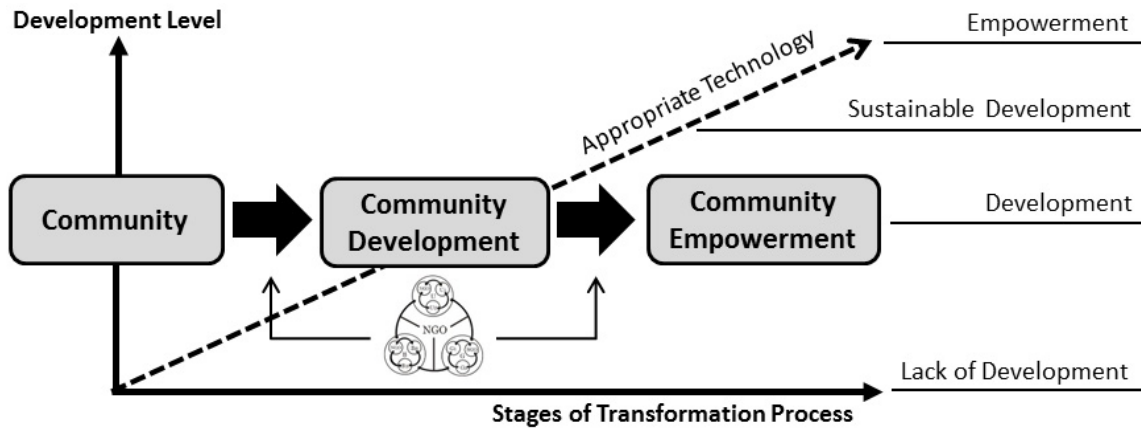


Fig. 2. Theoretical framework

3. Methodology

Empowerment as transformation process of a community should be understood completely through scientific thoughts as well as real field problems. Because of that, this study used literature survey and combined with multiple case studies. In order to provide complete pictures of the main idea, the sections were designed systematically based on the mix-method approach. The first section explained about the background what this study addressed as well as three research questions that must be answered. Existing literatures showed that there were contradictions between the concern from several entities in community empowerment projects to the implementation of their efforts related to the use of appropriate technology for sustaining the community development. Then, the second section reviewed literatures of each idea, which were about community empowerment, appropriate technology, and sustainable development. The result was the theoretical framework, which was used as the guidance in reaching the main purpose of this study. After that, a comprehensive discussion was provided in order to explain the debatable thoughts, how to sustain the sustainable development through appropriate technology. That section also attempted to provide the answer for research questions of this study. Last section will summarize the discussion and findings into several conclusions to give framework how to reach empowerment of community, which was beyond sustainable development. Additional section was used to explain the limitations of this study as well as ideas which can be used to give initial insights for further research based on this study.

4. Discussion

4.1. Sustaining the Sustainable Development

The term “sustainable” is often interpreted as the final solution of development. However, contradictive result is also often detected when the sustainable development is mostly given by the intervention of outsiders to rural community. African cases [31] as well as appalachia case [32] have shown that sustainable development condition must be continued in order to release the dependency of community members to the outsiders. Tightly related to the reality that community members are the main entity as well as business party in community empowerment projects [3], their motivation [33] of community members to work and continuously sustaining the given condition from outsiders. Based on these field cases and thoughts, a phase after development phase and sustainable development level can be

interpreted as the next level of sustainable development. When that idea is faced with the main purpose of sustainable development concept which concern on “the ability of future generations to meet their own needs” [16 p.43], there is a matching point on the keyword “ability” and “own.” It means that outsiders must aware that every community development projects must be leveled-up using empowerment approach. As a transofrmation process [2], empowerment will ensure the sustainability of given sustainable development.

EMPOWERMENT = *SUSTAINING THE SUSTAINABLE DEVELOPMENT*
EMPOWERMENT = *SUSTAINABLE (SUSTAINABLE DEVELOPMENT)*
EMPOWERMENT = *SUSTAINABLE² DEVELOPMENT*

The differences between development, sustainable development, and empowerment can be interpreted through appropriate keyword(s) for each development level. “Development” level can be stated as a level when outsiders give “things” in order to develop local community. The result is a condition when community members gain benefits compared with their condition before the outsiders come. In short, the keyword is “give.” The next step is “sustainable development.” This condition is the next purpose of development. The outsiders give “things” to rural community members to increase the quality of their livelihoods. The “give” process is followed by efforts to maintain the development. The maintenance can also be interpreted as efforts to sustain the ongoing development. Outsiders teach community members how to maintain the development by themself. So, the right keywords are “give” and “maintain.”

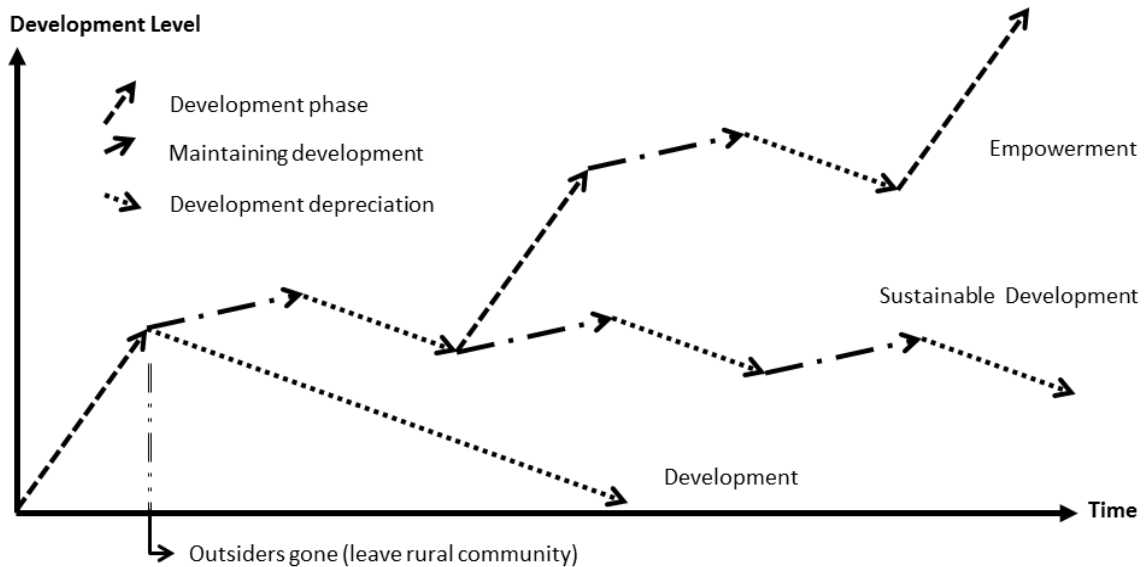


Fig. 3. Comparison between development, sustainable development, and empowerment approaches

However, “maintenance” efforts are only used to suppress the quality depreciations of the sustainable development itself. Sustainable development is still facing many difficulties in overcoming changes on the future. The development maybe still maintained someway, but community members will face many problems because outsiders do not teach them any capabilities to solve their future problems, how to adjust the ongoing development in the changes environment. Through this gap, empowerment approach provides the solution. In that approach, outsiders teach community members to “make” the development by themself. It is the next keyword after the “give” and “maintain.” By teaching such making activities

related to the ongoing sustainable development, community members can always adapt their efforts in sustaining the development by themselves, even when outsiders have already leave their areas and/or the project has ended. That is “empowerment” level. In this level, involvement of local entities is a vital point in sustaining the sustainable development. The output level of empowerment is decided by the combination of inputs, such as manpower, financial investment, and technology [34], so the continuous combination of community members, government, and academia must be implemented. The fails and success of the sustainable development is tightly influenced by the way local government do the governance [35]. On the other hand, such efforts in “making” the development must be integrated with continuous efforts in increasing knowledge transfers to community members from academia [3].

4.2. *Appropriate Technology in Community Transformation Stages*

It is clear that rural communities must be transformed to reach empowerment, a condition which will ensure the continuity of sustainable development. In order to get sustainability among rural communities, technology become a booster to reach it. Particularly, appropriate technology have a strategic position among the transformation process [31]. Many cases [36 - 41] have shown that very good opportunities for appropriate technology implementation are caused by the facts that the low rural community members’ income makes them unable to purchase agriculture advanced technology equipment to improve the quality of their agricultural products, a condition which is compounded by their lack of knowledge about cultivation as well as processing technology. The low level of knowledge makes them tend to have very slow adaptation to be able to capture the market condition and what is the technology which is able to make their products achieve the market demand. It results in difficulties to implement technologies by engineering consultant in community development projects. Technology transfer almost stops in term of the use of given technology and does not empower local people to develop and adapt it into their daily routines [4, 32, 40, 42, 43].

The widespread popularization of proven appropriate technology techniques is very problematic and requires a concerted effort by everyone [32]. Furthermore, they stated that technologies for less developed countries should go back at least in very simple forms to the dawn of human existence. In the combination with previous discussion, three stages of logic in reaching community empowerment is given below:

Table 1. Stages of logic

Development	Outsiders give hoe to local people. The hoe will be used to develop the farming activities.
Sustainable Development	Outsiders give hoe to local people and teach them how to use and maintain it with better method. The use and maintenance of hoe with better method will sustain the development of farming activities.
Empowerment	Outsiders give hoe to local people, teach them how to use and maintain it with better method, and also teach them how to make it by themselves, adjusting the function based on required conditions. These efforts will sustain the sustainable development, empower local people. When the outsiders leave them, local people will maintain the sustainable development by themselves.

Based on above stages of logic, the implementation of appropriate technology can be interpreted through new meaning of the term “appropriateness.” The common meaning of appropriateness is how different area/rural community must be developed using different appropriate technology method, and then it will produce different output or result based on different inputs regarding local conditions. However, “appropriateness” must be newly interpreted with the same goal for different area/rural

communities. In this approach, different implementation method of appropriate technology must also adapted to the local conditions, but all efforts/methods must also be adjusted flexibly in order to reach same goal even with different inputs.

5. Conclusions

Rural communities are the major entities in developing and third-world countries. Commonly, outsiders help them through community development projects. However, many projects had ended with only a calculation of comparison between “before” and “after” conditions. Furthermore, the development cannot be sustained by community members because low level empowerment. In this point, appropriate technology can fill in the gap to transform community development into community empowerment. The appropriateness of appropriate technology can help community members in maintaining the ongoing development (sustaining the development) as well as in making adjustment of technology to overcome future conditions in changing environment. Table 2 show the paralel connections among ideas in previous discussions and their position in community empowerment approach.

Table 2. Framework of empowerment

	Triple bottom line in sustainable development [17 - 30]		Trio perspectives of appropriate technology [10]	Three parties in community empowerment [3]
	Social	People	Social	Community members
	Environment	Planet	Technical	Academia
	Economic	Profit	Economic	Government
DEVELOPMENT → → →	SUSTAINABLE DEVELOPMENT → → →			EMPOWERMENT

The term sustainability can be understood from the issues around sustainability itself. Then, their approach turns out into the perspectives of appropriate technology. In this point, appropriate technology is positioned as the bridge between the concept of sustainable development to the parties around community empowerment projects. People as the focus of sustainable development must be interpreted as social perspective in the decision and selection of appropriate technology. Furthermore, Planet should be seen as all environmental effects of designed technology. However, it must be interpreted in broader meaning of technical perspective in appropriate technology to suppress the discourse of “green” issue. Then, economic issue must be interpreted as how much profit or economical benefits community will receive after technology implementation.

Finally, involvement of three most important parties must be encouraged in order to reach empowerment of rural communities. Community members become the focus of community empowerment projects, so all social issues must be focused on how community members behave in their daily routines. All efforts must not break their social goals, but support their daily activities with better quality. Furthermore, Academia must support empowerment through their efforts in providing best appropriate technology. Technical knowledges must also be transferred to community members to encourage the emergence of local “academia.” Moreover, economic issues must be supported through investment and policy. Local government should be involved deeply to support the sustainable development from financial side. All developed policy should also push-and-pull local people to do adaptation and adjustment of implemented technology to keep the sustainable development in changing environment. Through all above efforts, community members will always keep the sustainability of sustainable development, reaching empowerment.

6. Insights for Further Research

This paper is a part of an ongoing research designed to develop the appropriate design methodology of appropriate technology for sustaining the development of rural areas and reaching community empowerment. The modelling process is still underway therefore this paper would only able to discuss about the correlation between community empowerment, appropriate technology, and sustainable development. Other research may be able to extend this study in practical area with detailed issues of social, technical, and economic variables in local area. New research may also be designed to know the effect of changing environment to the adjustment or adaptation of appropriate technology based on the framework of empowerment.

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