THE EFFECTS OF COMMUNITY INVOLVEMENT ON THE SUSTAINABILITY AND SUCCESS OF INFRASTRUCTURE DEVELOPMENT PROJECTS

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

There are many organizations that work in underserved communities to provide essential infrastructure such as roads, bridges, housing, water access, etc. Underserved communities have the need for essential infrastructure systems, like those mentioned above, but do not have the means or government support to fill their needs. This is where outside organizations step in and initiate infrastructure development projects to serve the community that is in need. These outside organizations look to ascertain a given communities needs and how they can fill them through providing essential infrastructure that will provide lasting benefits for the community.

However, the ability to ascertain a given community's needs is a complex process that can result in the infrastructure development project proving to be unsuccessful. Infrastructure development needs can vary greatly depending on the given community. Determining a specific community's infrastructure needs can be very difficult due to different cultures, settings, and beliefs within a community. How then can an outside organization ensure that the infrastructure systems they are putting in place will prove to be successful and sustainable for the community they are serving? This can be done through community involvement in the infrastructure development project. Involving the community throughout the project has been shown to mitigate assumption of needs and lead to projects that are successful in addressing the community's true need. Also, when the community is heavily involved in the project, their ability to maintain the infrastructure in the future is greatly increased. This paper will further examine the effects community involvement has on infrastructure development projects.

Background and Significance

Many low-income communities have a significant need for essential infrastructure development. These underserved communities struggle with the availability of clean water, the ability to be connected to essential resources, and housing. The Federal Emergency Management Agency (FEMA) defines an underserved community as, "Groups that have limited or no access to resources or that are otherwise disenfranchised. These groups may include people who are socioeconomically disadvantaged," (FEMA, 2023). These communities need the aid of their government or outside organizations to provide essential infrastructure systems.

The main infrastructure needs for underserved communities are access to clean water, essential transportation infrastructure, and housing. The World Health Organization estimates that "1 in 3 people globally do not have access to safe drinking water," (World Health Organization, 2019). Without government aid, access to safe drinking water is difficult to attain. Not only does it require a certain amount of infrastructure, such as wells and storage facilities, but it also requires the community to understand the need to turn to a cleaner source of water. According to the World Bank, "One billion people still live more than 2km away from an all-weather road, where lack of access is inextricably linked to poverty," ("Transport Overview", 2022). For example, many communities are separated from key resources such as healthcare facilities, schools, and markets by impassible rivers. Without transportation infrastructure like a

bridge being put into place, the community will continue to be cut off from vital resources. Underserved communities' needs fluctuate and appropriate solutions can have further varied by cultural norms, geographic boundaries, and a multitude of other variables. Therefore, outside organizations have to tread carefully when providing infrastructure to ensure that their project is truly beneficial.

The need for outside organizations to step in stems from both a lack of government funding to communities that are in need and the inability of a low-income community to provide essential infrastructure for themselves. This is characterized through an infrastructure case study done in Nigeria. (Ibem, 2009) The study looked at Nigeria's current state of infrastructure provision and government funding statistics. This study differentiated in between the low income urban population, the overall urban population, and the total population in Nigeria. This study considered essential infrastructure to consist of secure housing, access to water, access to sanitation, electricity, education, and access to health facilities.

The study found that almost half of the basic infrastructure categories were provided to less than 50% of the urban poor population (Table 1). The data also shows that for the normal urban population the percentages of the basic infrastructure categories are higher. The lowest of the categories is 69.3% provision of access to secondary schools (Table 1). This data further characterizes the need in low-income communities who do not have the means to provide essential infrastructure for themselves (Ibem, 2009).

Table 1: *Percentage population with access to basic infrastructure in Nigeria (2006)*

Services	Urban population (%)	Urban poor (%)	Total population (%)
Secured housing tenure	73.5	56.9	61.2
Access to water	93.6	81.2	85.2
Access to safe water	73.4	53.4	51.4
Access to sanitation	77	49.2	57.6
Access to electricity	86.5	60.5	55.2
Access to primary school	86.7	68.4	75.9
Access to secondary school	69.3	42.1	47.3
Access to health facilities	70.9	45.9	55.1

Note: Taken from *Community-led infrastructure provision in low-income urban communities in developing countries: A study on Ohafia, Nigeria (Ibem, 2009)*

Also, the infrastructure study on Nigeria examined the Nigerian Federal Government's basic infrastructure provision budget. The overall budget for infrastructure provision was broken down the services the budget was provided for. This table highlights that only 0.53% of the budget was allocated to housing provision in 2004 despite Table 1 showing that for the urban

poor only 56.9% have access to secure housing (Table 2). The paper also states that, “The failure of government and the market to meet the infrastructure need of the low-income groups, on account of resource constraints has led to a partial withdrawal of government from public infrastructure provision,” (Ibem, 2009). This shows the need for outside organizations to be a source of essential infrastructure provision in underserved communities.

Table 2: *Federal government budgetary allocation to basic infrastructure provision in Nigeria*

Services	2004 (%)	2005 (%)	2006 (%)	2007 (%)
Education	3.99	5.14	6.8	8.08
Health	4.89	2.7	3.5	5.3
Housing	0.53	0.03	0.27	NA
Power and steel	10.12	0.17	0.17	4.56
Transport	0.45	0.16	0.19	0.56
Water resources	6.95	0.15	0.23	4.13
Works	8.64	1.2	0.9	8.3

Note: Taken from *Community-led infrastructure provision in low-income urban communities in developing countries: A study on Ohafia, Nigeria (Ibem, 2009)*

However, the ability of an outside organization to fill a community’s needs can be greatly hindered by the complex nature of infrastructure provision. All communities are unique in their size, population, geography, and cultures. Also, there is a considerable amount variation in the range of infrastructure provision that can take place. These complexities require outside organization to gain deep insights into the community they are serving in order to serve them successfully and sustainably.

The Social Construction of Technology (SCOT) STS theoretical framework sees all technology development as stemming from social action instead of technology causing social action. Using this framework, the underserved communities that are being served by outside development organizations are not merely users of the infrastructure put in place, but also the ones who define the specifications for the infrastructure being provided. This theoretical framework also provides a methodology to analyze the success of technology in a social group. “It is not enough, according to SCOT, to explain a technology's success by saying that it is ‘the best’—researchers must look at how the criteria of being ‘the best’ is defined and what groups and stakeholders participate in defining it” (Klett, 2018). SCOT points to the need for community involvement to ensure the success of infrastructure development projects.

If outside organizations do not allow the community to inform the specifications of the infrastructure development project, then the project is likely to be unsuccessful. For example, from a highpoint view, the goal of providing access to water seems to be relatively simple. However, the community’s needs must still be analyzed. The project team must ask how much water will the community need now and in the future? Or how will the community learn to service the well or water filters after the infrastructure is developed and the project team leaves?

Also, the team must analyze where is the community's population centered in order to determine the best place for a well. If the project team simply focuses on filling a base need as soon as possible, the project could suffer in the future from not being specifically tailored to a given community.

Community involvement can take many forms. A case study on community involvement in infrastructure development projects done in Ohafia, Nigeria, found that community involvement, "may be in the form of consultation, contribution of resources, formation of groups, decision-making and self-mobilization" (Ibem, 2009). Allowing the community to be involved in the ways mentioned leads to the community shaping the developed infrastructure. This ensures that the infrastructure provided is successfully inserted into the life of the community.

Methodology

The main approach that will be used to examine the effects of community involvement on infrastructure development projects will be to examine case studies of infrastructure development projects that focus on involving the community. There are many examples of infrastructure development projects that place a heavy emphasis on ensuring community involvement. There are two case studies done in Ohafia, Nigeria, (Ibem, 2009), and Bandung, Indonesia, (Maryati, 2015), that clearly demonstrate the need for community involvement in infrastructure development projects. Examining the processes of these two case studies will show that the sustainability and success of infrastructure development projects stems from community involvement. This paper will attempt to show the key aspects of a sustainable and successful infrastructure development project to inform the direction of future development projects.

Each community has a variety of different norms and values that define the specific needs of the community. The community in Bandung, Indonesia, is extremely urban while the community in Ohafia, Nigeria, is more rural. This change in setting is a norm that greatly influences the infrastructure needed and the optimum strategy to engage the community group. Both of the cases have a wide range of strategies to ensure community involvement. The two case studies also highlight a wide range of funding and implementation processes used by the two different community development organizations.

The level of success of the infrastructure development project will be defined by analyzing the infrastructures' impact on the two communities using the SCOT STS theoretical framework. The SCOT methodology for analyzing the failure of success of a technology consists of two stages, interpretive flexibility and closure. Interpretive flexibility means, "that each technological artifact has different meanings and interpretations for various groups," (Social Construction of Technology, 2022). This stage of the SCOT methodology focuses on examining the relevant social groups, in this case the underserved communities, that are both users and producers of the developed infrastructure. For the closure stage the infrastructure will be evaluated based on whether the community sees their need as being met. Using this STS

framework, the ability of the infrastructure to meet the true needs of the community, and therefore the success of the infrastructure, will be evaluated. (Social Construction of Technology, 2022)

Examining the immediate impacts listed by the case studies at the time of their occurrence as well as the future impacts, that can now be investigated, will help define the level of sustainability of the infrastructure development project. The level of sustainability of these cases will further define the role that community involvement plays in sustainable and successful infrastructure provision in underserved communities.

Results and Discussion

The case study on Ohafia, Nigeria, focuses on a community-based approach to infrastructure development. The article states that "The strategy of private sector and community participation in development is increasingly gaining recognition as an important tool for mobilizing resources and organizing people to take collective action in providing for their welfare in Nigeria," (Ibem, 2009). This study states that the reason that makes community involvement so essential is to determine the infrastructure needed. Also, this approach allows the community to contribute to the solution, allowing for future infrastructure provision to originate within the community. This conforms to the first stage of the SCOT STS framework. This stage focuses on seeing the users of the technology, in this case the community, as more than users but producers of the technology. When an infrastructure development project prioritizes ensuring community involvement, as this case did, the community has the ability to define the specifications of the infrastructure provided. This way the infrastructure that is built can be successfully embedded into the niche social group of the community. When the government or outside agencies determine what a community needs, this study states that this development is not sustainable for the community and can often fail to diagnose the community's true needs (Ibem, 2009).

The case study in Ohafia collected data on community involvement through distributing questionnaires on the topic. The case study states that the purpose of these questionnaires was, "meant to harvest the respondents' perception on community development projects, and provide information on how they contributed to realizing them," (Ibem, 2009). These questionnaires provided the researchers with in depth knowledge of the status of community development in Ohafia. In total, 155 questionnaires were filled out and every respondent indicated the presence of community development unions (CDUs) and community-based organizations (CBOs) in their community. Most all the respondents could point to specific community development projects they had been involved in, to varying capacities. One such project some of the respondents indicated was a new school built in the community.

The main ways the community was involved in infrastructure development projects was through the established development organizations that had been formed. The main ways individual respondents interacted with infrastructure development projects was though,

"prepared progress reports, provided technical advice on the projects to the CDUs, Chief-in-Council and CBOs on a regularly basis" (Ibem, 2009). These practical tasks allowed the community's voice to be heard throughout the design, construction, and implementation of new infrastructure systems.

Overall this case study concludes that, "Through proper articulation of the needs of the people by the CDUs and CBOs, a community-based approach is genuinely responsive to users' needs," (Ibem, 2009). Without the involvement of the community organizations, the needs of the people could not have been truly communicated to those in charge of the infrastructure project. This case study also illuminates the perspective that the community has towards the infrastructure systems put into place in their community. This study concludes, from the data of the questionnaires, that the community's needs were met through their ability to be involved in the project. Much like the second stage of the SCOT analysis for technology development, the community is able to define the closure of the infrastructure based on how they view its ability to meet their needs.

The study done in Bandung, Indonesia, has the main purpose of proposing a model for basic infrastructure provision for low-income communities. "This study recommends community-based model to be implemented in delivering infrastructure services for low-income groups," (Maryati, Humaira, 2015). This study measures the effect of the community involvement through descriptive and comparative analysis of the models used by the projects. One of the models that was examined by this case study was the Program Nasional Pemberdayaan Masyarakat (PNPM). This was a community development model put in place by the Indonesian government to provide infrastructure for low-income communities. The main focus of this model as stated by the case study was to implement "a community-driven development (CDD) approach, providing direct block grants to local communities at the sub-district level to finance an open menu of local development priorities," (Maryati, Humaira, 2015). This model's entire funding process is centered on ensuring that the local community has a large say in the specifications of the infrastructure provided.

This study also presents in depth analysis of the need for outside involvement in infrastructure provision. The study states that the low-income groups in Bangladesh only receive 20% of the infrastructure subsides from their government. With such little support from their government the low-income communities in Bandung lack basic infrastructure such as access to clean water and adequate housing. This study, while focusing on housing only and using a different methodology, still indicates that community involvement plays a large part in the process of providing infrastructure. (Maryati, Humaira, 2015)

Conclusion

Community involvement is key to ensure the success and sustainability of an infrastructure development project. Outside organizations cannot differentiate between perceived and real needs if they do not rely on the input of the community they are serving. All

infrastructure systems require varying levels of maintenance to ensure the system stays in place for all of its possible service life. The community must be involved in the implementation of the infrastructure system to ensure the community will be able to maintain the infrastructure system in the future after the outside organization leaves.

The evidence shown in the case studies done in Nigerian and Indonesian communities point to the success that follows projects who emphasize community involvement. This community-based approach to infrastructure development aligns directly with the SCOT framework's ideals. The SCOT framework is centered on the principle that technology is shaped by social action. As stated by the Klett, "It is not enough, according to SCOT, to explain a technology's success by saying that it is 'the best'—researchers must look at how the criteria of being 'the best' is defined and what groups and stakeholders participate in defining it" (Klett, 2018). Therefore, it is essential for these communities to be involved in infrastructure development so that they are viewed as more than users. Many organizations seek to develop infrastructure for underserved communities but unintentionally fall into performing services that are not needed. Infrastructure development projects must evaluate their efforts to involve the community they are serving before the project starts.

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