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Neighbourhood Infrastructure Financing Strategies: Experience from Installation and Maintenance of Electricity Infrastructure in Opako-Adigbe, Abeokuta, Ogun State

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Abstract

Reactions to lack of, or partial finance of infrastructure (provision and maintenance) by the government has triggered resort to self-help financing in many urban communities. This study investigates community self-help as a financing strategy for the installation and maintenance of an electrical transformer in Opako-Adigbe neighbourhood in Abeokuta, Ogun State. A Focus Group Discussion (FGD) was held with eight community representatives and a survey was carried with 228 house-representatives responding. Data was extracted from audio recordings of the FGD and questionnaires from the survey analysed with descriptive statistics and ranking. Findings indicate that residents will be encouraged to pay for infrastructure financing when they observe sincerity in the efforts of the government and their community association towards solving the identified problem. The residents were satisfied with the adopted installation and maintenance strategies but more satisfied with installation strategy than maintenance strategy. The findings of this study provides an avenue for learning about the workability of community-driven financing strategies. It will also assist the government in planning for urban infrastructure through effective collaboration with end users based on thorough understanding of how socio-economic contexts drive infrastructure provision. This is another community-based research that showcase the power of coordinated community efforts as a workable structure for the provision, and maintenance of basic urban infrastructure. The success of these strategies in the case-study area makes it applicable to communities with similar infrastructure needs.

Keywords: Communities; Electricity-transformer; Neighbourhood; Sustainable infrastructure

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1. Introduction

The important facilities and systems that made up the physical assets of a society, city or country is known as infrastructure (Brixiova, 2011; Oyedele, 2012). It includes procurement of amenities and generation of services from such amenities. Hence, infrastructure encompasses both the procurement of amenities and provision of services from them.

In Nigeria, lack of and poor functioning of urban infrastructure are indications that governments are only interested in starting urban infrastructure projects whereas maintenance and continuous operational functionality of such infrastructure are not keenly pursued. Asides the public financing, there is, therefore, an increasing need for private financing, which include community efforts, as regards the procurement of new and existing infrastructure as well their proper maintenance (UNIDO, 2001). While provision entails procurement and installation, maintenance of infrastructure is the act of protecting an infrastructure from decay or dilapidation. Through such a move, it will remain functional, retain its economic importance and durability for sustainable outcome (Okafor and Aigbavboa, 2019; Mawoli, 2021).

Good communities help promote economic inclusion with social benefits, which include intangible things like residents' concern with their community public good or infrastructure (Okpoechi *et al.*, 2020). In Nigeria, it is a common knowledge that low-income people do seek solutions to their housing problem without government involvement through the concept of incremental building (Bello, 2021). Further to this, residents of various urban centres have also, through self-help efforts and actions, embarked on the provision of community infrastructure as a means of promoting their well-being. This is done in recognition of gaps in public service provision and maintenance, considering the role of infrastructure in functional human settlements (Dowall, 1991).

Community action in infrastructure provision implies that through the efforts of people in a community, common needs and values can be shared and the contributions of residents can be enhanced in the provision of infrastructure (Adedayo and Afolayan, 2012). Infrastructure gap, as a problem, is not only rooted in the shortage and inefficiency; ageing and poor maintenance of available ones will widen the already created gap. Clearly, sustainable access to infrastructure is a prerequisite for economic growth and sustainable living (Adeboje *et al.,* 2020). As a concept, sustainability centres on the use of resources vis-à-vis their preservation for future generations (Okpoechi *et al.,* 2020). Stakeholders' participation in the sustainability of community infrastructure must, therefore, not be underrated in solving this infrastructure related problem.

In Nigeria, the Ogun State Government procured substantial quantities of electrical transformers for distribution to some communities in the state. In 2013, interested, registered community associations in the state applied for transformers through the Commissioner for Special Duties, Governor's Office through the Permanent Secretary to the Ministry of Community Development and Cooperatives, Okemosan, Abeokuta Ogun State.

The selected communities to which the transformers were allocated later faced a problem – the challenges of its installation – after the procurement of the facility from the state government because the government was not willing to finance their installation and/or their maintenance. Only one of the transformers was successfully installed for use within four months (April 9, 2014 – August 8, 2014) and this was the one allocated to the case study area: Opako-Adigbe neighbourhood in Abeokuta.

The purpose of this study therefore is to investigate how the installation was successfully financed at relatively short period, thereby providing a post-installation assessment focused on the communities' satisfaction with local strategies, and the future plan for the functioning and maintenance financing. The study seeks answers to four questions. What strategies were adopted to have the electrical transformer installed without the government or external financial aid? How has the infrastructure been maintained or sustained financially and functionally? What is the level of residents' satisfaction of the financing strategies? What lesson can other communities learn from these? This will help to improve the strategies adopted and guide other communities in self-help financing of community infrastructure and government planning as regards urban infrastructure growth through effective collaboration with the end users.

2. Literature Review

2.1 Infrastructure, Social Capital and Public Goods

In general term, infrastructures are the physical facilities in terms of the institutional arrangement for its procurement by funding or sponsorship, operation, and maintenance. It is the basic facilities, systems and services that a community or society can use to work effectively (Nubi, 2002). Udoudo and Udoidem (2017) describe infrastructure as vital facilities of economic and social importance necessary for the creation of environment that can guarantee the growth of urban centres.

Fixed physical component of infrastructure is the complete systems of procuring commodities and services required to make the sustenance of an enhanced living conditions for a society. This may be procured by public, private self-help or non-governmental arrangement.

Social capital, as synonymous to public goods or fixed physical infrastructure, is a new approach to social relationships that have the potential of reforming thinking about society with the outcomes that may either be positive or negative (Mort *et al.,* 2003). It is also the asset of a community which has some useful activities that require the formation/establishment of capital and maintenance of networks and connections that are necessary in meeting social and economic needs of individuals and communities (De Filippis, 2001).

Social capital is a pattern of social relationships that demands some required action. Economic capital is similar to the bank accounts of individuals while human capital exists in the minds of individuals. In this regards, Adler and Kwon (2002) differentiate between social and economic capitals. They affirm that when people relate to one another in the community, social capital occurs (Bowles and Gintins, 2002). However, this social capital can only occur when this relationship is incorporated in the social structure (Narayan and Pritchett, 1999).

2.2 Community Involvement/Self-Help Arrangement in the Provision of Infrastructure

Community development, as a way of developing urban areas infrastructure, entails the capacity and willingness of people to engage in the tasks of identifying and prioritizing community needs in term of effective planning and implementation purposely to improve their conditions of living – with or without external assistance – (Musa, 2005) through self-help arrangement.

Self-help itself is the community residents' reaction against the government's neglect to their need. Its core embraces self-organizing and provision of required amenities and services that those in positions of political authority are not willing to provide (Ogundipe, 2003). According to

Afigbo (2000) self-help effort is a form of development strategy that requires the participation of the end users towards the promotion of community growth, aided by self-determination of the people of the community with the aspiration of bringing positive changes to their community.

There are relevant studies in this area. On the role of infrastructure in the development of a community involves filling the gap created by failure of the state government in provision of urban infrastructure, Ibem (2009) examined how community-based organisations in Ohafia, Nigeria addressed the challenge relating to infrastructure provision in their communities. Although, the findings have implications on policy and concept that can aid the understanding of socio-economic and political dynamics of adopting community-based solutions into the urban development process, it was unable to extend to the maintenance/sustainability of the procured infrastructure after their installation.

Udoudo and Udoidem (2017) critically examined the strategy of urban infrastructure funding in Nigeria, assessing impact and reviewing the urban infrastructure funding policy in the country. Their conclusion indicates that under-funding infrastructure development by the government in Nigeria is connected with any of these: poor budgeting, inaccurate estimation of the acquisition cost, and wrong estimation of maintenance cost or mismanagement of allocated funds for such projects. They argued that urban infrastructure provision and maintenance funding should both be included in the national budget of the central government, and the statutory government agencies should monitor the execution of the projects.

In their study, Adedayo and Afolayan (2012) examined the implications of self-efforts provision of infrastructure by communities in medium-sized urban centres in Nigeria. Their findings indicated the existence of high involvement of the communities in the provision of infrastructure. However, the type and quantity of infrastructure provided varied from one community to the other. A balanced regional development of infrastructure can be achieved through community involvement and participation because other surrounding urban centres can emulate the practices of communities that have successful community development projects.

With an historical and regional perspective, Uduku (1994) focused on the inadequacies in social infrastructure provision in Nigeria's urban areas, observing that little attention is paid to community-based self-help processes. The study concludes that community efforts need a reviewed consideration for the overall development of the city as a whole.

The beliefs on qualitative characteristics, among small-holder maize farmers in community social relations, were quantified by Tham-Agyekum and Nimoh (2013) who investigated social capital levels among small-holder maize farmers in the Kwahu North District in Ghana. The results of the study showed access to resources, attendance at community activities and moderate level of flow of information among the maize farmers.

2.3 Infrastructure Maintenance and Sustainability

Social capital, public goods or infrastructure (physical, social or economic capital) needs to be sustainable economically and functionally. When equipment, facilities or systems are designed to meet the essential service needed in a community on the basis of all-round sustainable principles, such is referred to as sustainable infrastructure. It can also be referred to as the equipment, facilities or systems that can guarantee the continuation of economic and environmental requirement without hindrance (Na and Raksakulthai, 2006).

Furthermore, it borders on designing and maintenance of buildings, structures, and other facilities with the sole aim of conserving their expected usefulness (Aje, 2013). According to Idachaba (1985), infrastructure represents durable assets of varied structures, materials, and equipment, with flow of future benefits, but requiring fixed capital for its acquisition and frequent maintenance for their sustainability.

Inter-America Development Bank (2018) defines sustainable infrastructure as "projects that are planned, designed, constructed, operated, and decommissioned in a manner to ensure economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire life cycle of the project." Therefore, it is the physical asset that reaches or maintains a sustainable state with ability to enhance efficiency in its life span. With the exponential growth of urban areas in developing countries (Nigeria inclusive), infrastructure sustainability seems to be important as relates to its production, efficiency and environmental consciousness.

After noting a deficiency in context and formal efforts of ensuring sustained infrastructure development in Nigeria, Olanipekun *et al.,* (2014) contribute to the efforts at contextualising and formalising sustainable infrastructure development in the country. Their study suggests approaches that reflect the effective commitment of government efforts, a peculiar need of Nigerian environment with inclusive participation of people of the community as the global best practice of sustainable infrastructure development.

The level of infrastructural maintenance in public institutions in Nigeria is central point of the investigation done by Okafor and Aigbavboa (2019) on the University of Nigeria, Nsukka Campus. The study unveils a problem – lack of funding for the maintenance of the university's infrastructure. The study further discovers that the university relies more on corrective maintenance than preventive maintenance. The study recommendation, therefore, affirms that a holistic maintenance model of infrastructure planning (which prefers the prevention to correction) should be followed in line with international best practices as done in advanced countries.

Considering the possibility of attainment of SDG goal 11 (sustainable cities and communities), Okpoechi *et al.* (2020) observes that public infrastructure in Owerri, Nigeria, are inadequate where available, thereby detracting from the achievement of environmentally and socially sustainable neighbourhoods for the residents with a clear absence of an integrated housing infrastructure policy; a serious implications for social sustainability. The study recommends that housing estate development in Nigeria must integrate, from the beginning, the basic facilities and services that will complement the individual housing units. The end result of this is the creation of a sense of community that would ensure proper management and maintenance.

Due to inadequate funding, maintenance of infrastructure remains a problem. This accounts for fast depreciation of durability, economic value and sustainability of public amenities (Okafor and Aigbavboa, 2019). However, this problem can be solved by good maintenance plan at the project inception to completion stages via preventive rather than corrective method (Adejimi, 1998). Maintenance plan is a very important part of infrastructure design but it is neglected in Nigeria, unlike in most developed countries where infrastructure is designed alongside its maintenance plan. Lack of maintenance plan is the catalyst of serious economic loss because it costs more money to rebuild dilapidated infrastructure than to carry out a proper preventive maintenance plan.

In this review of literature, the importance of the collaboration between the government and the communities (the end users of the infrastructure) is widely acknowledged especially since the government is not capable of solely financing the procurement, installation and maintenance of all community infrastructure. However, the emphasis on end users' post-installation maintenance plans is inevitable. Since infrastructure is not only limited to procurement/provision, it extends to the installation and post-installation maintenance for attainment of its sustainability. This is a conspicuous gap that needs to be filled in the literature, to which this study responds.

3. Research Methodology

This cross-sectional case study research has a clearly specified local setting based on the assumption that each local community has its own unique and peculiar problem. Therefore, the findings of this research shall be evaluated not in terms of universal validity or applicability as in fundamental research, but in terms of its local applicability (Alabi, 2003).

Opako-Adigbe neighbourhood is the study area for this research. It is made up of three communities (Temidire, Aanuoluwapo, and Irepodun) in Adigbe Council Development Association of the Obafemi Owode Local Government, Abeokuta, Ogun State. Opako-Adigbe neighbourhood spans from Lala Junction; shares boundary with Moshood Abiola Polytechnic and extends to Ogun River area. It is one of 39 communities that make up Adigbe Council Development Association.

In the three communities that made up the study area, extreme low electricity voltage was experienced for years due to overload of the then existing electrical transformer coupled with frequent prolonged blackout whenever the facility is faulty. On the 28th November 2013, through one of its communities (Irepodun), Opako-Adigbe neighbourhood procured an electrical transformer from the Ogun State Government. The physical presentation was not done until April 2014.

The study adopts the triangulation research method; a-mixture of qualitative and quantitative data collection methods. A focus group discussion (FGD) with the Joint Transformer Installation Committee (JTIC) of the Opako-Adigbe neighbourhood on the strategies adopted for the installation and sustenance plan for the transformer on one side (qualitative) and questionnaire administration on the residents on the up-to-date functional performance and maintenance of the neighbourhood electricity transformer was carried out on the other side (quantitative).

According to Uji (2009), when small number of knowledgeable people (less than ten) represents a larger group, FGD is preferred because it has the advantage of providing a cross section of well informed and accurate information about the chosen topic of mutual interest (to both the researcher and the concerned group). This is especially very useful when it is combined with structured questionnaire. Since this study is set to elicit data from small group that will be verified by larger group of a community, the combination of qualitative and qualitative data collection for this study from the JTIC and each representative of all houses in the study area respectively is most desired.

The FGD was held on the 23rd November 2021. The 98-minute audio recording were retrieved and analysed. A pilot study was conducted randomly on selected twenty representatives of houses and some face-to-face interviews were also carried out. This improved the outcome of the questionnaires and the efficiency of the inquiry in response to Moser and Kalton's (1974)

recommendation. The responses from the twenty houses, during the pilot survey, were compared with their final responses during the main survey to check and confirm the reliability of the responses.

A questionnaire made up of close ended, open ended and ordinally scaled questions (5-scale Likert response types) were distributed to and retrieved from each target population between 27th November, 2021 and 19th January, 2022. JTIC was made up of nine members (3 members from each community) while 318 houses were connected to the Ibadan electricity distribution company (IBEDC) mains. House owners or accredited representatives of the residents in each house were the target population. Enumeration of the total target population was done.

Eight of the nine members of the JTIC, which conforms to Morgan (1988), Dawson *et al.* (1992), and Uji (2009) were engaged on the specified date for the FGD. The houses of eight members of the JTIC were exempted from the surveyed households to avoid double response. Hence, questionnaires were provided to 310 houses. However, only 228 houses responded to the study questionnaire successfully with appreciable participation (of more than 60% of the target population) from each community. Table 1 shows the breakdown of houses per community that made up Opako-Adigbe neighbourhood and responses from the target population from each of the communities.

The collected data from the FGD were extracted through the audio file and presented in speech-text quotations form. The extracted data were analysed with descriptive statistics, and ranked with the Relative Importance Index (RII). The severity index was also used to confirm the ranking of the RII as an extension of the work of Olusola and Adesanya (2004). The frequency of options to the questions asked was calculated on percentage basis with:

$$\% = \frac{FC}{TFC} \times 100 \quad \text{..... (1)}$$

Where: FC = frequency counts on each option, TFC = total respondents or frequency counts which for this study is 228. As regards the 5-point Likert scale, Relative Importance Index (RII) and Severity Index (SI) were calculated from the data as follows:

$$RII = \frac{TFW}{TFC} \quad \text{…..... (2)}$$

Where FW = FC x W, W = the weight assigned to each option (5 for fully satisfied, 4 for partially satisfied, 3 for neutral, 2 for partially dissatisfied and 1 for completely dissatisfied). The RII are then ranked in order to determine their position of preferences.

For Severity Index (SI);

$$SI = FS + PS \quad \text{..... (3)}$$

Where FS = the percentage of frequency of fully satisfied option:

$$FS = \frac{FWFS}{TFW} X \frac{100}{1} \quad \text{..... (4)}$$

$$PS = \frac{FWPS}{TFW} X \frac{100}{1} \quad \text{..... (5)}$$

Table 1: Total existing houses, houses under construction and vacant land at Opako-Adigbe

Community	No of houses connected to PHCN mains	No of uncompleted houses	No of vacant land	No respondents
Temidire	112	58	33	77 (68.75%)
Irepodun	92	37	24	58 (63.04%)
Aanuoluwapo	114	102	46	93 (81.57%)
TOTAL	**318**	**197**	**103**	**228 (71.70%)**

Researchers' field survey (2022)

4. Research Findings

4.1 Findings from the Qualitative Data (FGD/Interview)

Prior to the procurement of the electrical transformer, there was no peace among the communities in the neighbourhood.

> *"We always engage ourselves in leadership tussle coupled with superiority problems, and that has been hindering our community growth in a big way"* Joint Transformer Installation Committee (JTIC member 6).

However, when Ogun State government provided a transformer to one of these three communities (i.e. Irepodun-Opako), the three communities formed a united front, and faced a common challenge – the need for electrical transformer. *"Nine-member Joint Transformer Installation Committee JTIC (made up of 3 representatives from each community) was subsequently formed to handle the transformer installation to a successful conclusion and extend to its maintenance and sustainability"* (JTIC member 8).

The JTIC first estimated the required total cost of installation of the transformer. Next, *"we identified and enumerated all houses currently connected to the IBEDC main, all uncompleted houses, all vacant land and all businesses directly connected to the use of electricity in their mode of operations (hotels, pure water factory, welding workshops) within the neighbourhood"* (JTIC member 5). Based on the number of houses connected to the IBEDC mains and total installation cost estimated, "levy on the beneficiary houses and business entity was done and the opening of a dedicated account for the project as well as continuous joint collection by JTIC members at stipulated time" (JTIC member 7).

The sum of N8,300 was levied per house and *"all the 318 houses total collection amounts to N2,639,400"* (JTIC member 8). In addition to the completed/uncompleted houses and vacant lands, there were two hotels, one pure water factory and three welding workshops. Each hotel and pure water factory was levied N25,000 while the welding workshops were levied N50,000 each, totalling N225,00. Addition of this to N2,639,400 amounts to N2,864,400 as the total amounts generated for the installation.

Major items purchased for the installation include: *"acquisition of 150 mm uprising cables, feeder pillars, incoming cables, transformer base and additional concrete poles while the work activities included construction of grinding base, fencing and gating of the transformer base, relocation of some existing electricity poles, electrical workmanship, IBEDC staff charges and logistics among others"* (JTIC member 3). Sequential work process was done as levy collection progresses. "*This builds the confidence in the houses to pay their levy without much delay"* (JTIC member 8).

"Total of N2,693,080 was however expended on the complete installation of the electrical transformer (for all purchases and all work activities) while excess of N171,320 naira was kept in the JTIC dedicated account" (JTIC member 2). It was hoped *"this balance and the N8,300 that will be collected from each identified 197 uncompleted houses and 103 vacant lands in the neighbourhood will be a means of maintaining the transformer and making its replacement easy after the useful life span"* (JTIC member 8). The JTIC anticipated the sum of N855,097 in this regard as addition to *N*171,320 and *"decided not to use any of these sum for a purpose other than that of transformer sustainability"* (JTIC member 6).

Further to the recommendations of the electricity transformer expert consulted by the JTIC, *"procurement of a replacement plan of 15 years (2014 to 2029) was made with the plan to recover levies from the uncompleted and vacant land when they want to connect electricity"* (JTIC member 2). This is hoped to complement the scrap value of the transformer and the levy to be proposed on each house for the replacement of the electrical transformer on the attainment of its predicted useful life span.

4.2 Results from the Quantitative Data

Tables 2, 3 and 4 further present the findings of the research from the quantitative perspective, through the administered questionnaire. As indicated earlier, a total of 228 responses were successfully received, made up of 77, 58 and 93 from Temidire, Irepodun and Aanuoluwapo communities respectively. As presented in Table 2, single-house accommodations occupied by single household of between 4 to 6 persons predominantly exist in these communities. The respondents were predominantly married men with post-secondary education attainment and they are owners of the houses having lived in the property for 9 to 12 years.

Table 2: Houses and respondents' identity details

1. **Houses per Community:**	TEMIDIRE			77 (33.77%)
	IREPODUN			58 (25.44%)
	AANUOLUWAPO			93 (40.79%)
2. **Type of houses:**	Compound houses with multiple households			12 (5.26%)
	Compound houses with single household			25 (10.96%)
	Single house with multiple households			55 (24.12%)
.	Single house with single household			136 (59.65%)
3. **No of residents in the compound:**	1-3 persons			38 (16.67%)
	4-6 persons			106 (46.49%)
	7-9 persons			53 (23.24%)
.	More than 10 persons			31 (13.60%)
4. **Respondent identity details:**	Sex:	Male		209 (91.67%)
		Female		19 (8.33%)
	Marital status:	Married		187 (82.02%)
		Single		03 (1.31%)
		Widow/Widower		22 (9.65%)
		Divorcee		16 (7.02%)
	Description:	Owner of the house		193 (84.65%)
		Owner's child		12 (5.26%)
		Owner's wife		04 (1.75%)
		Residents' Representative		19 (8.33%)
	Occupation duration:		1-4 years	01 (0.44%)
			5-8 years	18 (7.90%)
			9-12 years	191 (83.77%)
			12 years above	18 (7.89%)
	Education level:	No basic education		11 (4.82%)
		Primary school		43 (18.86%)
		Secondary school		51 (22.37%)
		Post-secondary school		121 (53.07%)
		Other forms of educ.		02 (0.88%)

Researchers' field survey (2022)

The responses to the installation and maintenance strategies adopted are presented in Tables 3 and 4. From the Tables, the finding shows that most of the residents were frequently involved in the activities and meetings of the communities and community members related with one another in the community. The major pressing challenge that they had in the past 5 to 10 years was poor and lack of energy supply through the IBEDC mains occasioned by weak electrical transformer. This was conspicuously solved by the communities with the combination of partial intervention from government and the efforts of the communities.

Levying of each house that is already connected with IBEDC mains in the entire neighbourhood made the effort of the communities a success and this was confirmed by the JTIC members during the FGD. The levy was streamlined for ease of payment, but the residents made payments progressively according to the progress seen in the transformer installation process.

The respondents were asked how satisfied they are with the installation and maintenance strategies adopted for transformer project by their communities. Most of the respondents expressed full satisfaction with the strategies while very few expressed complete dissatisfaction. This is applicable both to the installation and the maintenance of the transformer. It was reflected further that apart from the levy they all paid sometime in 2014, no levy or charges was asked from the residents by the communities for the maintenance of the transformer.

However, as satisfied as the residents were with the installation and maintenance strategies adopted by their communities, most of the respondents strongly disagreed that the strategies can be replicated to solve problems faced by neighbouring communities. This was indicated by their response that, apart from the common problem of lack of functional transformer which these strategies were used to solve, each of the other problems faced by their different communities will require different approaches to solve.

Table 3: The responses to the installation and maintenance strategies adopted

1. **Level of participation of your house in the community association meetings and programs**	Frequent participation in the community activities	129 (56.58%)
	Occasional participation in the community activities	62 (27.19%)
	Seldom participation in the community activities	24 (10.53%)
	Never participated in the community activities	13 (5.70%)
2. Can you recollect the major problem facing this community in the	Lack of cooperation in the community	56 (24.56%)
	Bad road network/inappropriate layout plans	08 (3.52%)
	Lack of sufficient drainages	09 (3.95%)
	Insecurity of lives and properties	08 (3.51%)
	Lack of community centres	12 (5.26%)
	Lack of public portable water	06 (2.63%)
,	Poor/lack of IBEDC energy supply	129 (56.58%)
3. **Which of these problems have so far been solved?**	Lack of cooperation in the community	48 (21.05%)
	Bad road network/appropriate layout plans	16 (7.02%)
	Lack of sufficient drainages	11 (4.82%)
	Insecurity of lives and properties	13 (5.70%)
	Lack of community centres	04 (1.72%)
	Lack of public portable water	08 (3.51%)
	. Poor/lack of PHCN energy supply	128 (56.14%)
4. If any of these problems have been solved, how was or have they been solved?	With government complete intervention	09 (3.95%)
	With government partial intervention and community efforts	143 (62.72%)
	With Non-government organisation intervention	00 (0.00%)
	With complete community efforts	65 (28.51%)
	With Private/corporate body intervention	11 (4.82%)
5. How do you pay for the levy charged towards solving the problem(s)?	We paid the levy once	19 (8.33%)
	We paid the levy twice	34 (14.91%)
	We paid according to the level of progress of the project	109 (47.81%)
	We paid in instalment on regular basis	23 (10.09%)
.	We don't pay until the installation was completed	43 (18.86%) .
6. Are you satisfied with the *procurement/installation* strategies adopted by the communities to solve the	Fully satisfied	152 (66.67%)
	Partially satisfied	63 (27.63%)
	Neutral	02 (0.9%)
	Partially dissatisfied	08 (3.51%)
. above problem(s)?	Completely dissatisfied	03 (1.31%).
7. To what extent are you satisfied with the *maintenance/sustainability* strategies adopted by the communities?	Fully satisfied	144 (63.16%)
	Partially satisfied	58 (25.44%)
	Neutral	17 (7.46%)
	Partially dissatisfied	06 (2.63%)
	Completely dissatisfied	03 (1.31%)
8. What is your experience about the installation levy and the subsequent maintenance charges for the transformer project?	So far, no maintenance charges was paid on the transformer	224 (98.25%)
	Monthly due is being collected for the maintenance	0 (0%)
	Yearly due is being collected for the maintenance	01 (0.44%)
	Charges were levied occasionally to maintain	0 (0%)
	Charges were levied when major repair is required	03 (1.32%)
9. Can the strategies adopted to solve these problem(s) be replicated for other existing problem(s)?	**-**Strongly agree	35 (15.35%)
	-Agree	23 (10.09%)
	-Neutral	03 (1.32%)
	-Disagree	41 (17.98%)
	-Strongly disagree	126 (55.26%)
10. What informed your choice above?	**-**Communities attached varied preference to each problem	36 (15.79%)
	-Situation of the problem may vary inter communities	26 (11.40%)
	-Variation in level of residents' willingness to participate	10 (4.39%)
	-Committee for the project can only apply the ideas with limit	17 (7.46%)
	-Each problem obviously have different mode of approach	139 (60.96%)

Researchers' field survey (2022)

Further to the descriptive statistics in Table 3, Table 4 presents the ranking of residents' level of satisfaction as regards the procurement/installation on one side and maintenance and sustainability of the transformer on the other side. The result reflects that residents' level of satisfaction on the procurement/installation process (4.76) is higher than that of its

maintenance/sustainability (4.70). This finding was corroborated by the Severity Index where the ranking of level of satisfaction of the residents as regards the procurement/installation process of the transformer (94.30%) is higher than that of its maintenance/sustainability (88.60%).

Table 4: Level of residents' satisfaction to the adopted strategies (RII/SI)

Ranking by Relative Importance Index

Level of satisfaction by the occupants of the neighbourhood	Fully satisfied (5) FC (FW)	Partially satisfied (4) FC (FW)	Neutr al (3) FC (FW)	Partially dissatisfied (2) FC (FW)	Completely Dissatisfied (1) FC (FW)	Sum of weighted frequency (TFW)	Relative Importance Index (RII)	Ranking
procurement/installation	152(760)	63(252)	02(06)	08(16)	03(03)	1037	**4.76**	1st
maintenance /sustainability	144(720)	58 (232)	17(51)	06 (12)	03(03)	1018	**4.70**	2nd

Ranking by Severity Index

Level of satisfaction by the occupants of the neighbourhood	Fully satisfied FS	Partially satisfied PS	Neutral **N**	Partially dissatisfied PD	Completely dissa tisfied CD	Total Percentage (%)	Severity Index (SI)	Ranking
procurement/installation	66.67%	27.63%	0.9%	3.51%	1.31%	100	**94.3%**	1st
m*aintenance /sustainability*	63.16%	25.44%	7.46%	2.63%	1.31%	100	**88.60%**	2nd

Source: Researchers' fieldwork (2022)

Asides from these closed-ended questions, the responses to the open-ended questions, in respect of the identified problems with these adopted strategies, were also collated. The responses indicated that *"houses were equally levied irrespective of the building size, energy consumption level, or the number of residents therein"* (one the houses representatives). The respondents were of the further view that the cost of installation was supposed to be divided into three parts for each of the three communities to contribute as equal entities.

New resident houses were required to pay the same amount paid by the old residents during the installation. *"Tenants who are having temporary stay will also be required to contribute towards the procurement of new transformer to replace the existing one which they may not benefit from"* (one the houses representatives). The JTIC does not take the prevention of fault seriously as they always take the repair of faults seriously. The committee members are rotated on an almost annual basis which may be a barrier to the effective continuation of the maintenance and replacement plan activities.

5. Discussion of Findings

The findings on the houses and respondents' identity details indicate the communities' characteristics, which signify the competence of the respondents and their ability to supply the required data for the study. Thus, the findings of this study are justified based on the suitability of the houses involved in the survey on one side and the respondents from those houses on the other side. The study shows that common problems in a neighbourhood can compel the unity of community residents (a change from erstwhile disharmonious state).

Most of the residents were frequently involved in the activities and meetings of the communities and community members relate with one and the others in the community in conformity with the findings of Afigbo (2000) and Bowles and Gintins (2002) that social capital as catalyst of self-help can only exist when people in a community are able to relate with one another.

Decision to jointly solve the common problem is the catalyst that forms the main aspect of residents' concern about their neighbourhood problem as presented by Okpoechi *et al.* (2020). In this case, the united efforts include the provision and maintenance of electrical transformers jointly with government. Also, availability of functional infrastructure and obvious sustainability plans can aid the willingness of residents to pay for the procurement/installation and, by extension, the prompt settlement of utility bills (IBEDC among others) and can enhance the property values in the communities.

Acceptability of community based infrastructure development efforts by the residents is a function of trust and transparent handling by the people put to such tasks by the community association. Residents, therefore, tend to meet up on their financial obligation as regards infrastructure funding when they have confidence in the progress and process of doing things by their representatives. This is in conformity with the initial finding of Udoudo and Udoidem (2017) where mismanagement of allocated fund for the infrastructure discouraged residents' cooperation in further infrastructure funding. The respondents indicated that fund for the transformer maintenance cannot be diverted to other purpose different from transformer maintenance.

Although there is high level of satisfaction among the residents on the adopted strategies for installation and maintenance of the transformer infrastructure, the satisfaction level in installation is higher than that of maintenance. This indicates a need for improvement in the adopted maintenance strategy. This perhaps, may be linked to the respondents' observation that the JTIC do not take prevention maintenance as seriously as correction maintenance. This conforms to the study of Okafor and Aigbavboa (2019) which discovers the residents' reliance on corrective maintenance (which is more costly) than preventive maintenance.

Apart from the common problem of lack of functional transformer that the strategies were used to solve, other problems faced by different communities will require different approaches to solve. This is in conformity with the finding of Adedayo and Afolayan (2012) that community infrastructure requirement varies in type and size and, therefore, the solution to solve them must also vary. However, the emphasis of Adedayo and Afolayan (2012) is on the level of involvement of residents, rather than level of satisfaction of the adopted strategies by the residents.

The sustainability of infrastructure through a planned maintenance is not limited to procurement and installation. It extends to conservation of the economic usefulness and inclusiveness of end users over the entire life of the infrastructure without economic hindrance as postulated by Na and Raksakulthai (2006), Aje (2013) and IDB (2018). The extension of the responsibility of the JTIC beyond the installation includes the post installation maintenance. This is in line with "the principle of integration of proper maintenance plan with the infrastructure at the inception of the project"; the advocacy of Adejimi (1998) and Okpoechi *et al.* (2020). The maintenance plan in this study is however not limited to maintenance, but it extended to the replacement plan after the projected useful life span (15 years).

6. Conclusion

This community self-help study investigated the adopted financing strategies for the installation and maintenance of transformer infrastructure by the Opako-Adigbe neighbourhood in Abeokuta, Ogun State, determined the level of residents' satisfaction, and derived the lessons to be learnt from these financing strategies for the communities and the government.

This study gave insights to how the concerned communities strategize for future enhanced performance of their electrical infrastructure. It also provides a guide to other communities in solving their transformer infrastructure needs through appropriate self-help financing. It will let the government understand the importance of socio-economic dynamics of adopting community based solutions to urban development process and aid them in planning of the urban infrastructure growth through effective collaboration with the end users (the urban community residents).

To improve the strategies adopted by these communities in any other similar project of its kind in the future, and for the strategies to be easily adopted by other communities, it is suggested that houses should not be levied equally, but be levied according to their building size, energy consumption rate, or the number of residents therein. New resident houses should not be made to pay exactly what old residents paid during the installation. Furthermore, community contribution should be equal instead of equal levy for individual houses. The time value of money should be taken into consideration because a naira paid in year 2014 will not be the same with one naira paid in 2022 or payable at later years.

The idea of a replacement plan for the electric transformer is good, but tenants and other temporary residents must not be forced to contribute towards the procurement of a new transformer which they may not benefit from eventually. The set-up transformer installation committee should focus more on prevention than waiting for a cure; this may prolong the anticipated life span of the transformer. Rotation and frequent changing of membership of the JTIC may create a setback to the adopted strategies because such action may affect the effective operation of the maintenance activities and by extension its anticipated eventual replacement.

As a limitation, the study did not inquire into how each housing unit raised the levies among its residents. This is a community-based research that showcased the power of coordinated community efforts as a workable collaboration not only for the provision but by extension for the sustainability of basic urban infrastructure needs. However, as good and efficient as the adopted strategies by the studied communities were, they may not be universally applicable to solve other communities infrastructure problems because each community problem would require a unique solution. Therefore, the findings from this study should not be evaluated for universal validity or applicability, but in terms of its local applicability.

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