



EXTENT OF VANDALISM OF PUBLIC INFRASTRUCTURE IN TANZANIA: A CASE OF TANESCO IRINGA MUNICIPALITY

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ABSTRACT

Infrastructure is an essential component of a residential development. Good infrastructure helps in providing economic services efficiently and promoting economic development. In this paper, I investigate the extent of vandalism of public infrastructure in Tanzania: a case of TANESCO Iringa Municipality. The research employed quantitative research approach whereby descriptive survey design was used to gather data. The targeted population was 102 beneficiaries of TANESCO where a sample size of 81 was drawn out of it. Convenience sampling was used for the selection of respondents. Descriptive statistics was used to analyze data using SPSS v.20 software. The findings revealed that beneficiaries of TANESCO are aware on the related effects of mismanaging public infrastructure owned by TANESCO as there will be lack of electricity power; unable of operate machines using electricity and the cost for repairing damaged public infrastructures will be increased. Moreover, the study revealed that awarding reporters of vandalism of public infrastructure influences people to report more activities of vandalism of public infrastructure. The study concludes that public infrastructure helps to transfer electricity, if mismanaged, people will lack electricity power. In addition, it is important to award anyone who reports vandalism of public infrastructure. The researcher recommends that there is a need for the government to work together with community members to be easily identifying electricity thieves and those who do vandalism so as to punish them. TANESCO should raise awareness to the community member on the important of managing public infrastructure. More awards should be provided to the reporters.

INTRODUCTION

Good infrastructure helps in providing economic services efficiently and promoting economic development (Musyoki & Gakuu, 2018). Infrastructure is an essential component of a residential development. Infrastructure can be explained as the facilities, structures, equipment and similar physical assets that are important for people to thrive as individuals and participate in the economic, political, civic, household, and other roles in ways critical to their own well-being and that of their society (Hardekar & Chakraborty, 2018).

Electricity is one of the major determinants of the economic prosperity of any country. It plays a significant role in undertaking daily activities from cooking, lighting, heating to powering machines in the industrial sector. Electricity is also essential for quality healthcare delivery, education, transport, effective communication, mineral exploration and many more; serving as the building block on which every sector of a nation's economy thrives. This emphasizes how crucial and indispensable electricity is for human existence in the 21st century. However, realization of these positive outcomes can be hampered by severe electricity supply challenges (Kumi, 2017).

The U.S Department of Energy (2015), on quadrennial technology review: an assessment of energy technologies and research opportunities point out that, the electricity power system is facing increasing stress due to fundamental changes in both supply and demand side including the changing mix and characteristics of electricity generation sources (natural gas, renewable energy, and coal), changing demand loads in retail electricity markets, integration of smart grid technologies for managing complex power systems, growing expectations for a resilient and responsive power grid in the face of more frequent and intense weather events, cyber and physical attacks also aging electricity infrastructure.

Scott and Seth (2013) on the political economy of electricity distribution in developing countries, a review of the literature revealed that, barriers to expanding access to electricity have been broadly categorized as financial and economic; capacity and technical; and policy and institutional. The first of these include high costs of investment and operation (and the affordability of tariffs), access to investment finance and the effectiveness of cost recovery mechanisms. In the second category

are technical and managerial capacities to design, install and operate electricity systems, and the efficiency of the technologies deployed. The third category includes the adequacy of the policy framework and the effectiveness of institutions responsible for implementing policy

A study conducted by Kumi (2017) on challenges facing the electricity supply in Ghana revealed that the electricity supply challenges can be attributed to several factors, including a high level of losses in the distribution system, which is mainly due to the obsolete nature of distribution equipment, equipment vandalism, as well as nonpayment of revenue by consumers. Other factors are overdependence on thermal and hydro sources for electricity generation and a poor tariff structure, which makes it difficult for the utility companies to recover the cost of electricity production.

Mensah (2018) who surveyed 20 African countries on electricity shortages and unemployment in Africa revealed that electricity outages is an outcome of variation in technical losses in electricity transmission and distribution mainly results from technological, geographic and climatologically factors while also there is non-technical losses which mainly results from theft, vandalism, unmetered supply and operational inefficiencies of the utilities.

Enofe and Aimsonroviye, (2010) on the study concerning maintenance impact on production profitability revealed that, power supply interruption can occur due to scheduled maintenance and unscheduled outages. The scheduled interruption occurs mainly to carry out periodic maintenance of the power supply infrastructure. However unplanned interruption is caused by unpredictable events such as storms, accidents, vandalism and equipment failure. The intent of periodic maintenance is to keep the flow of electricity in steady supply free from unpredictable interruptions. Thus throughout the study focused on investigating the extent of damage and vandalism of public infrastructure in Tanzania, a case of TANESCO infrastructure based on customers side management specifically on unplanned (non-technical) power supply interruption including vandalism, theft, accidents, storms and equipment failure.

Electricity is considered one of the basic attributes of modern life. It is a key input to produce goods and services, as well as quality of life. Despite the importance of electricity yet there is challenges faced by electricity supplier companies which hamper the provision of electricity supply to the consumer and increasing operation cost to the company while reducing the income of the company (Mensah 2018).

Smith (2014) on electricity theft, a comparative analysis shows that the financial losses are critical to many electric power organizations. Lost earnings can result in lack of profits,

LITERATURE SURVEY

General Aggression Model

According to Lam et al., (2016) various studies have been done on vandalism against physical objects which have been conducted mostly in the broad framework of criminology, employing concepts and theories from social psychology and sociology, particularly in the 1970s and 1980s. While explaining the general aggression model (GAM), Bushman and Anderson (2018) argue that 'human aggression is any behaviour directed towards another member of a community or their property that is carried out with the intent to cause harm or damage'.

shortage of funds for investment in power system capacity and improvement, and a necessity to expand generating capacity to cope with the power losses. Some power systems in worst affected countries are near bankrupt. Marnatha (2012) on the report concerning rehabilitation and recovery in the power sector point that, the electricity sub-sector suffers from unsustainable operations owing to financial constraints because of non-cost reflective tariffs, collection inefficiencies, and vandalism of distribution infrastructure. The loss of experienced staff in the last decade also contributed to the sub-standard performance of electricity supply industry. The unsustainable performance of the sub-sector is reflected in the low investment in infrastructure and substandard poor delivery of service.

Tanzania relies on several energy resources for its power generation. About 45% of the country's electricity comes from hydro (URT, 2021). However, poor rains in the past few years led to water shortages that affected the turbines generating electricity. As such, Tanzania embarked on a deliberated measure to forge an energy mix which will ensure reliable availability of power for the economy. This deliberate measure involves promotion of increased use of renewable energy technologies (solar, wind, biomass, wastes, micro hydro), natural gas and other locally available energy sources including coal and geothermal. As of the year 2021 Tanzania's total electricity supply was 1605.86 MW (URT, 2021).

TANESCO (2016) on their corporate business plan of 2016 – 2017 they indicate that TANESCO's financial and operational performance has been weak whereby in income a total sale up to the third quarter ended 31st March 2016 amounted to TZS 1,082 billion, which is 7.46% below the target of TZS 1,169 billion for the same period. Financial and operational poor performance were characterized by high power losses, unreliable power supply and unhealthy liquidity position where also TANESCO they further revealed that political and government interference, climate change, vandalism of power system infrastructure, high cost of liquid fuel, ageing workforce, theft of electricity, obsolescence of equipment, hydrological risk, and environmental concerns are among major challenges hamper financial and operational performance.

A large body of literature has highlighted factors challenging electricity supply from technical to non-technical or planned and unplanned event factors. Yet little was known about the extent of damage and vandalism of public infrastructure in Tanzania (electricity infrastructure) based on customers' management of electricity infrastructure. Therefore this study investigated the extent of vandalism of public infrastructure in Tanzania: a case of TANESCO Iringa Municipality.

According to Lam, et al., (2016) it is not necessary for all acts of aggression to be criminal in nature. Thus, a sub-classification of human aggression as either anti-social behaviour or criminal behaviour is helpful in differentiating the two overlapping concepts. Further clarity is provided by Lam et al., (2016) who identified vandalism as principally a subset of anti-social behaviour, which does have an overlap with criminal behaviour. All three themed topics are part of a broader concept of human aggression.

According to Lam, et al., (2016), behaviours is regarded as

'different' or outside the norm can be labeled as anti-social. They stressed that anti-social behaviour should not be confused with criminal behaviour, as harm and offence are two key constituents for criminal behaviour, which is not the case for anti-social behaviour. However, they noted that there is a definite overlap between the two concepts as exhibited in Figure 1 above. Moreover, anti-social behaviour is context-specific.

What is considered anti-social, or what is tolerated or even celebrated, is dependent on norms of acceptability for that place and situation. Figure 2.1 classification guides us towards a better understanding of vandalism as a behaviour which is considered as being against the interests of the community, although it may not be criminal in nature. This willful or unintentional defacement of others' property to fulfill one's immediate goals is defined as vandalism by the Oxford dictionary, (Bushman & Anderson, 2018).

Empirical Studies

Piccolo et al., (2014) conducted a study on Effect of Energy Consumption Awareness in the Workplace: Technical Artifacts and Practices in Brazil. A descriptive design was used whereby the study employed online survey with 33 volunteers. Descriptive statistics was used in data analysis to get their views where the study found out that despite all technological advances in the energy research field and the ubiquitous presence of technology in all aspects of life, lack of information is still recognized as a gap to engage people in a pro-environmental behaviour towards energy conservation.

Khalim (2015) conducted a study on Methods for Raising Environmental Awareness in Developing Countries and Social Responsibility Engagement in Liberia. Cross-sectional study was done where total of 631 household were survey to collect primary data which was collected via closed ended questionnaire. Data was analyzed using descriptive statistics. The findings revealed that public resource management it affected by different factors and one among the major factors was public awareness on the impact of the managing natural resources.

Kim (2017) studied on Effects of Public Benefit Campaigns on Promoting Energy Conservation and Energy Efficiency in Seoul, Republic of Korea. The study employed cross-sectional data whereby primary data via open ended questionnaire from 289 households. Data were analyzed using descriptive statistics. Findings revealed that Public awareness and public bene-

METHODOLOGY

The research employed quantitative research approach whereby descriptive survey design was used to gather data. The targeted population was 102 beneficiaries of TANESCO where a sample size of 81 was drawn out of it. Convenience

RESULTS & DISCUSSION

Vandalism of Public Infrastructure

Table 1 shows respondents' vandalism of public infrastructure owned by TANESCO. Findings show that 72.8% of the respondents have not mismanaged public infrastructure owned by TANESCO while 27.2% mismanaged public infrastructure

The work of Lam, et al., (2016) supports this approach by defining vandalism as 'willful damage to or destruction of property owned by others. Thus, acts that destroy, damage or deface property are classified as vandalism. Many researchers and practitioners have used adaptations of Cohen's (1973) typology of motives as a framework for understanding vandalism. Cohen's broad and influential classification of types of vandalism, based on the offender's purpose included: acquisitive, tactical, ideological, vindictive, play or malicious. However, incorporating these motivational attributions into the definition of vandalism has been problematic. For instance, there has been difficulty in attributing the damage to statues in temples of Angkor Wat in Cambodia to natural wear and tear that is the weathering effect or to deliberate acts of tourists to satisfy hedonic instincts. Similarly, damage to property could be accidental and not intentional; thus, the behaviour lies outside the motivational framework proposed by Cohen.

fit campaigns play an important role in raising awareness of the public and in drawing public attention to the risks or advantages of certain behaviour. For instance, the promotion of public safety and public health relies to a large degree on public benefit campaigns. Examples include public awareness campaigns that call for "safe driving", for the "avoidance of alcohol or drugs when driving cars or operating machinery", for the "wearing of seat belts" in private cars or public transportation, for the "wearing of helmets" on bicycles or construction sites, for "prophylactic medical check-ups" etc. "No-smoking" campaigns also fall into the category of public awareness and public benefit campaigning. Public awareness and public benefit campaigns draw the attention of consumers to the risks of accidents or to the "internal"/personal and "external"/public costs of certain behaviour or consumption.

Munene et al., (2019) conducted a study on Challenges facing Energy efficiency in Public Institutions in Kenya. The study employed descriptive design whereby data was collected from 137 households. Data were analyzed using descriptive statistics. The findings revealed that energy efficiency depend much on the knowledge of the targeted audience who are the community, they further state that the first knowledge community needs is on how to report the event such as theft of resources and damaged infrastructures.

sampling was used for the selection of respondents. Descriptive statistics was used to analyze data using SPSS v.20 software.

owned by TANESCO. This implies that, most of electronic users at Kihesa Ward did not mismanage public infrastructure owned by TANESCO, but few of them did. This means that there is a little magnitude of vandalism of public infrastructure owned by TANESCO at Kihesa Ward.

Table 1: Vandalism of Public Infrastructure

Mismanagement	Frequency	Percent
Mismanaged	22	27.2
Not mismanaged	59	72.8
Total	81	100.0

Source: Field data (2021)

Reporting the Vandalism of Public Infrastructure

Table 2 shows the reporting vandalism of public infrastructure, whereby 90.9% of the respondents who experienced vandalism of public infrastructure owned by TANESCO did not report to the authorities while only 9.1% reported the vandalism of public infrastructure owned by TANESCO to the authori-

ties. This implies that, some of electricity users at Kihesa Ward experienced the vandalism of public infrastructure owned by TANESCO but they do not report the vandalism of public infrastructure. This affects public infrastructure management at Kihesa Ward.

Table 2: Reporting the Vandalism of Public Infrastructure

Reporting	Frequency (n=22)	Percent
Reported	2	9.1
Not reported	20	90.9
Total	22	100.0

Source: Field data (2021)

Type of Vandalism of Public Infrastructure Owned by TANESCO

Table 3 shows type of vandalism of public infrastructure owned by TANESCO experienced by respondents. Findings show that 68.2% of respondents comment that vandalism of public infrastructure owned by TANESCO was due to theft while 31.8% said vandalism of public infrastructure owned by

TANESCO was due to vandalism. This implies that, the most common type of vandalism of public infrastructure owned by TANESCO experienced by electricity users at Kihesa Ward was theft. This means that public infrastructure management at Kihesa Ward is mostly affected by stilling public infrastructure owned by TANESCO.

Table 3: Type of Vandalism of Public Infrastructure Owned by TANESCO

Type of Mismanagement	Frequency (n=22)	Percent
Vandalism	7	31.8
Theft	15	68.2
Total	22	100.0

Source: Field data (2021)

Related Effects of Vandalism of Public Infrastructure

Table 4 shows that, based on multiple response, the following were the mentioned effects related to vandalism of public infrastructure owned by TANESCO at Kihesa Ward; lack of electricity power; unable of operate machines using electricity and

increase cost for repairing damaged public infrastructures. This implies that when public infrastructure owned by TANESCO are mismanaged, there will be lack of electricity power; unable of operate machines using electricity and the cost for repairing damaged public infrastructures will be increased.

Table 4: Related Effects of Vandalism of Public Infrastructure

Related Effects	F	%
Lack of electricity power	10	12.3
Unable of operate machines using electricity	43	53.1
Increase cost for repairing	28	34.6
Total	81	100.0

Source: Field data (2021)

The researcher was interested to identify the effect of customer awareness on vandalism of public infrastructure. The findings revealed that all respondents agreed that it is necessary for people to manage public infrastructure owned by TANESCO because it provides a substrate for modern life through the network of wires, towers, and dams; it is used to transfer electricity for lighting rooms, working fans and domestic appliances like using electric stoves, A/C and more; and in factories, large machines are worked with the help of infrastructures to transfer electricity. Thus it is very reasonably to manage public infrastructure owned by TANESCO because public

infrastructure helps people to get electricity services easily.

Moreover, the study revealed that beneficiaries of TANESCO are aware on the related effects of mismanaging public infrastructure owned by TANESCO as there will be lack of electricity power; unable of operate machines using electricity and the cost for repairing damaged public infrastructures will be increased.

The results are inconsistency with Piccolo *et al* (2014) who found out that despite all technological advances in the energy

research field and the ubiquitous presence of technology in all aspects of life, the lack of information is still recognized as a gap to engage people in a pro-environmental behaviour towards energy conservation.

In addition, the results are inconsistent with Khalim (2015) who revealed that, public resource management is affected by different factors and one among the major factors was public awareness on the impact of the managing public infrastructure.

CONCLUSION

The study revealed that majority of the beneficiaries of TANESCO were aware on vandalism of public infrastructure, because those public infrastructure owned by TANESCO helps to transfer electricity to the beneficiaries. Moreover, they understand the related effects of mismanaging public infrastructure because they will lack electricity power. In addition, awarding reporters of mismanagement of public infrastructure will help

RECOMMENDATIONS

As a result of these study findings, the researcher recommends the following;

There is a need for the government to work together with community members to help them in identifying electricity thieves and those who do vandalism to punish them with the aim of increasing better management of public infrastructures.

The TANESCO should raise awareness to the community member of Kihesa Ward on the importance of managing public infrastructure with respect to the importance of electricity power to their life.

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Therefore, it is important for the beneficiaries of TANESCO to be aware on the vital contribution of electricity infrastructures on their daily life. The findings mentioned ways for managing public infrastructure owned by TANESCO as; not touching electricity cables, reporting for any damaged infrastructure owned by TANESCO and using infrastructure owned by TANESCO effectively because public infrastructure helps people to get electricity services easily.

to manage and ensure effective supply of electricity to the public. Also, at Kihesa Ward, people do not mismanage public infrastructure like theft or vandalism because of unemployment, but because they need money. Jobless people and employed people, all mismanage public infrastructure at Kihesa Ward.

On the management point of view, the TANESCO management should continue to provide awards to the reporters of vandalism of public infrastructure especially for thefts and vandalism. Because it will increase chances of identifying thieves while reducing the likelihood of vandalism of public infrastructure.

Also, community members should work hard to find better sources of income and avoiding engaging with electricity thieves and vandalism for earning money.

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