

# INFRASTRUCTURE DEVELOPMENT IN ZAMBIAN TERTIARY INSTITUTIONS: COPING WITH POPULATION EXPANSION

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**Abstract:** The present research evaluates infrastructure development in Zambian Tertiary institutions: coping with population expansion. The study used Systematic review of the literature and an analysis of primary data. The methodology consisted of two phases: A literature review of the steps taken and empirical data obtained from questionnaires and interviews. As one of the fastest growing economies in southern region of Africa, Zambia faces opportunities as well as challenges as she strives for development in the area of tertiary education while coping with population expansion. A purposive sampling method was used to select respondents who included educators or lecturers and students. Structured interviews were used for infrastructure standard officers at the Higher Educational Authority, the District Education Board Secretaries (DEBS), educational planning officers, college management officials from each institution and officials from the Teaching Council of Zambia (TCZ) students from different higher learning institutions of Lusaka Province. Data was obtained using the semi-structured interviews and observation. These higher learning institutions were purposively sampled due to their nature of being in existence for ten or more years since their establishment both private and public. Development in this area is a great challenge especially in the time when Zambia is experiencing population expansion.

**Keywords:** Higher Education; Teaching counsel; Tertiary institutions; Population Expansion; Infrastructure

## 1 INTRODUCTION

Zambia faces divers economic, demographic, social and environmental challenges that calls for the development of appropriate infrastructure to support economic and social development and social as depicted by the National infrastructure policy (2023). The attainment of the country's vision 2030 requires modern and reliable infrastructure, especially the ones related to tertiary institutions in the midst of population expansion. As one of the fastest growing economies in southern region of Africa, Zambia faces opportunities as well as challenges as she strives for development in the area of tertiary education while coping with population expansion as there is insatiable hunger for higher education. Educational infrastructure in this case deals with early child education, primary, secondary and tertiary education facilities. The country has made strides in the development of educational infrastructure at various levels. Educational infrastructure at the tertiary level is hit the hardest. Most of the existing infrastructure is dilapidated and has inadequate supporting facilities such as water, electricity, laboratories, libraries, workshops and staff houses. One of the higher learning institution I visited, I found students fetching water outside the campus due to water scarcity. Even though I went there for other purposes, this situation caught my attention and management didn't want to face me or ask why I was there, thinking I was from one of higher government institution or offices. In addition to this, I found some students learning from outside due to lack of space Due to the above situations, and many others that have not been mentioned in this paper, there is need to address the infrastructure deficit in education especially at the tertiary level because of the growing population.

One of the recommendation is for Government to re-introduce serious workshops on maintenance or rehabilitation and how to increase infrastructure facilities to be held once every term or semester at national level, for the purposes of sharing ideas, experiences and knowledge especially for the tertiary educational level. This should include public and private higher institutions not forgetting trade institutions.

## 2 LITERATURE REVIEW

### 2.1 The Need for Infrastructure Development and Maintenance in Higher Institutions

Quality education requires good infrastructure and equipment. Education is viewed as a need and one of the fundamental human rights. It is to be upheld by every well-meaning individual, community and country or continent. Nonetheless, for any form of education to be beneficial it must be of good quality.

Adeboyeje and Emertarom refer to school infrastructure and equipment as enablers of the teaching and learning which also increases the production of good results.

### 2.2 Types of Infrastructure and Equipment

When we talk about School infrastructure and equipment we mean materials, resources, buildings, and equipment that facilitate learning and teaching. Ekpoh has referred to school infrastructure as comprising buildings, ground, facilities and equipment which are essentials in the implementation of educational programmes. Asiyai sees them as permanent and semi-permanent structures such as machinery, laboratory equipment, the black or white board. Condition of infrastructure and equipment is paramount for the attainment of educational goals and development of the learner.

### **2.3 Infrastructure vs Student Population**

Most papers that have been written in this domain have dwelt so much on the challenges of materials, resources and equipment that facilitate learning but less have looked at student population that is growing daily in relation to infrastructure in terms of buildings. This is the main purpose of this paper.

On the other hand, those who look at the building as an infrastructure only deal with preventive maintenance, to prevent wear and tear so that its usage is prolonged. Secondly, others only look at corrective maintenance. Akpan defines Corrective Maintenance as spontaneous maintenance service which involves timely reaction of physical items [1]. Deals with correcting damage made to physical structures by unpredictable events such as whirl winds, storms and those that may happen due to vandalism or flooding. However, only few have dealt with the need for new infrastructure due to the growing demand because of population expansion.

Higher institutions are expected to contribute to economic development processes. Availability and accessibility of infrastructural facilities are determinant factors in achieving this goal. Benneworth and Fitjar affirmed that higher institutions contribute to worker market upskilling. Benneworth and Fitjar assertion collaborated with the submission from the Organisation for Economic Co-operation and Development (OECD). It was recommended that regional innovation strategies systematically incorporate higher institutions to drive regional growth. This can only be achieved if the infrastructure to facilitate them is available in these higher institutions. Marques believes that higher institutions can support new industries' emergence. Anderton avowed that higher institutions could assist in creating collective innovation as sets via highly skilled graduates if the necessary facilities are there. In many developing countries, meeting the minimum infrastructure development in higher institutions are issues that have lingered for a long time. In Ghana, funding has been identified as one of the critical issues and a threat to higher education development. Financial sustainability is one of the measurement tools to measure a vibrant higher education system. The author affirmed that in the past two decades, higher institutions funding was collected from tax payer sources (70%) (Ghana's Government budgetary allocations and allocations from Ghana's Education Trust Fund) while the balance of 30% came from students' charges (fees and other charges). The latter is internally generated funds (IGF) of institutions and private contributions. Expanding the private donations from companies with policies to motivate these organisations to build infrastructure is one of the implications of this paper via a proposed framework. In Nigeria, Gbadegesin and Aluko and Enefola found inadequate infrastructure in Nigeria's educational sector because of poor funding. The author discovered that from 1999 to 2014, the budgetary allocations were far below the recommended 26% benchmark by UNESCO. In 2019 and 2021, the budgetary allocation was 7.02% and 5.6%. Enefola suggested that higher institutions should look inwards to generate income either commercially or through public private partnerships to fund infrastructure. The author's recommendation may deprive the children of the poor that are intelligent from higher educational qualifications. This is because either of the options will lead to a hike in tuition fees. Wentworth and Makokera asserted that an estimated US\$66 billion is needed annually for African nations, including Nigeria, for infrastructure development. Accessing this fund from international partners, alliances with development finance institutions, and private investors may be difficult, especially in Nigeria, because of evidence of disregard for some previous concession projects. Bolomope found that the popular PPP is not free from weak project viability, inadequate capacity to manage the project, inconsistent government policies, lacunas in the legal framework, and low capital base by local financial institutions, among others. Attempting to explore other options led this study to the next sub-title.

### **2.4 Current Population Crises at Major Public and Private High Learning Institutions**

As of 2018, Zambia already had a total of one hundred and six private colleges and universities affiliated to the Teaching Council of Zambia, and that number has since grown exponentially. The numbers are far much more than the public universities and colleges that offer training for teachers and other fields in the country.

According to the daily mail dated 14th February 2024 the Copper Belt University CBU had recorded a 35 percent increase in the number of students from 10 666 in 2022 to 14 415. In 2021 there were about 30 000 students at the University of Zambia both undergraduates and post-graduates

In the perception of Marlon and Booth (2007) [2], the goal of infrastructure in education is to increase school attendance of students, enhance staff motivation and improve academic achievements of students.

Bray, Clarke, and Stephens (2002) had earlier concluded that quality education is fruitful when there is adequate quantity and quality of physical infrastructure; and that unattractive school buildings, crowded classrooms contribute to poor academic performance [3].

In the 2020 paper called “the state of High Education in Zambia,” the authors tabulated on the student enrollment by gender in the public and private universities in Zambia as shown in the following table 1 below

**Table 1** Student Enrollment by Gender in Private and Public Universities

Type of university	Male	female	total
Public	27 300	23 254	50 554
Private	31 362	32 053	63 415
total	58 742	55 307	114 049

Education will create solid economic growth. Ateloye identified some issues that may hinder the private sector from investing in the higher education infrastructure in Nigeria and other nations of Africa. And focused on the public-private partnership (PPP) procurement system. This study is looking beyond this scope. Ateloye found parties inability to comply with the contract agreement, absence of governance, weak institutional frameworks, absence of transparency in the process, corruption in the public sector, issues with funding, absence of higher institutions autonomy to partner with private companies and absence of stakeholders’ management. Uwak and Udofia suggested that the government should work on its transparency and integrity issues, including the governance system. Exploring CSR via an expanded approach may improve the engagement of the private sector in higher institutions’ infrastructure development. The philosophy is proposing an incentive via a policy to encourage the private sector to expand their system in the infrastructure development in the educational sector, especially in the higher institutions in Nigeria and other developing nations in Africa which he termed expanded corporate social responsibility

### 3 METHODOLOGY

The research was organized in a format of a critical review of literature, which provides an opportunity to “take stock of learning environments research by drawing material from diverse sources and traditions (grant and Booth 2009) [4]. This has been achieved by a thorough analysis and synthesis of the information, leading to a set of propositions developed by the author. The main selection criteria for the literature was to choose sources that derived knowledge from sound empirical evidence.

These are grouped under the following;

1. Availability of university/college spaces for enrollment
2. Learning spaces; how big or small are structures made
3. Healthy or state of college/university infrastructure

The above was dealt with mainly using secondary and primary data which is from books, articles, and other research papers not forgetting people with experience in the same field and students. On the primary data collection, questionnaires and structured interviews were used to collect the primary data. The questionnaires were administered to the educators or lecturers and students. Structured interviews were used for infrastructure standard officers at the Higher Educational Authority, the District Education Board Secretary (DEBS), educational planning officers, college management officials from each institution and officials from the Teaching Council of Zambia (TCZ)

These interviews were a collaborative effort that offered qualitative information on the problems and achievements made regarding Infrastructure development in Zambian Tertiary institutions: coping with population expansion. The interviews were conducted in a semi structured format because the purpose of the study, as established earlier, was to have the respondents describe in detail the nature of their experiences and their understanding of the choices that can lead to infrastructure development in Zambian Tertiary institutions: coping with population expansion.

### 4 DATA ANALYSIS

The data collected from both qualitative and quantitative methods will be analyzed using the following approaches:

#### 4.1 Qualitative Data Analysis

Thematic Analysis: Transcripts and notes taken from the interviews and focus group will then be analysed thematically. The researcher will analyze literature reflecting the effectiveness, challenges, and perceptions of Infrastructure Development. This procedure will regard devices and response codes under major subjects like "types of infrastructure and its maintenance," "economic advantage," and "environmental issues."

Triangulation: Qualitative data collected from interviews, and observations shall be valid and reliable [5]. This will assist in confirming the obtained results and ensure that a broad understanding of the Infrastructure Development in Zambia: coping with population expansion has been ascertained.

#### 4.2 Quantitative Data Analysis

#### **4.2.1 Descriptive statistics**

Quantitative data from surveys and questionnaires will be analyzed using measures of central tendencies, including mean, median, and standard deviation. This will assist in explaining how Infrastructure Development has influenced factors such as the quality of tertiary education in Zambia.

#### **4.2.2 Correlation analysis**

A Pearson correlation coefficient will be used to test the relationship between Infrastructure Development considering population expansion and the quality of education in Zambia.

### **5 ETHICAL CONSIDERATIONS**

**Informed Consent:** Participants will be explained the reason for the study, and consent will be sought before they are administered, either through interviews or questionnaires. Respondents will also be informed of the anonymity of responses and the voluntary nature of the study. **Cultural Sensitivity:** The researcher will also respect the local and cultural beliefs of farming practices in the appropriate areas. Of course, emphasis shall be placed with reference to gender issues especially conforming to gender expectations and balanced contributions.

### **6 LIMITATIONS OF THE STUDY**

#### **6.1 Scope of Study Area**

The study will only cover the Lusaka District region, and therefore, the results attained in this research may need to be more conclusive than those of other regions.

#### **6.2 Theoretical Framework**

Some researchers have identified many major theories associated with the current study. These include Communication Theory, Conflict Theory, Green Theory, Legitimacy Theory, Instrumental Theory, Social Contract Theory, Stakeholder Theory, and Shareholder-Agency Theory. For this study, only a few will be dealt with. These theories supported the proposed framework. Mordi asserted that SCT regarding CSR is addressed from either political or ethical philosophy perspectives [6]. The essence of the theory was to build a business-society relationship on a solid foundation. This aligns with the framework, motivating investment in higher institutions' infrastructure development so that better graduates with innovative skills can be turned out. From the perspective of the "business-society contract," the Social Contract Theory focuses on organisation via social welfare policies and programmes, and infrastructure development in the host communities, who are stakeholders by extension. It will mitigate issues that may create a crisis between the host communities and the organisations.

Instrumental theory in education also known as instrumentalism is the idea that knowledge and skills should be practical and useful, rather than abstract, it emphasizes active learning and problem-solving based on real life experiences. According to Karl Marx, this is a theory which reasons that policy makers in government and positions of power tend to share the common business or class background and that their decisions will reflect their business or class. It perceives the role of the state as more personal than impersonal actions such as Nepotism favoritism are common among those in power. This is the reason according to the author why we have the problem with infrastructure development in Zambia.

Legitimacy theory is a concept that explains how organizations can maintain legitimacy by adhering to societal values and norms. It is based on the idea that organizations tend to have an implicit social contract with society in which they operate if an organization doesn't respect the society's expectation and norms it can lose its right to operate. This theory applies well in the principle of Public-Private Partnership. This theory deals with social contract, societal norms, voluntary reporting, social responsibility and sanctions.

Concerning the Incentive Theory, Meng and Gallagher and Kwawu and Laryea emphasized that the focus is to appeal to the private organisation (agent) offering the CSR (ECSR) in a way to maximise its profit by investing in infrastructure development in the host higher institutions as used in this framework [7]. In this instance, the framework introduces incentives such as tax relief to be supported by policy. It will encourage private organisations to invest in Nigeria's higher institutions' infrastructure development, and by extension, in other developing countries with similar infrastructural facilities gaps. This framework will form part of the contributions to the body of knowledge. In line with the expanding work of Blyth's as reported by Bower, the incentive (tax relief) will stimulate private organisations to invest in higher institutions infrastructure development and, in the process of performing their duties, get something (tax relief) in return. The essence of transforming and innovation via proposed policy (incentive - tax relief) is to enhance measures that will assist in bridging the Nigerian higher institutions' infrastructure development gaps. This proposed new process via incentive will transform CSR into ECSR and may promote more infrastructure development in higher institutions if well implemented. This mechanism may encourage private organisations to wholeheartedly welcome this framework [8]. This is because the proposed scheme will be a win-win for them. It will train the employees that will be employable and productive to them in

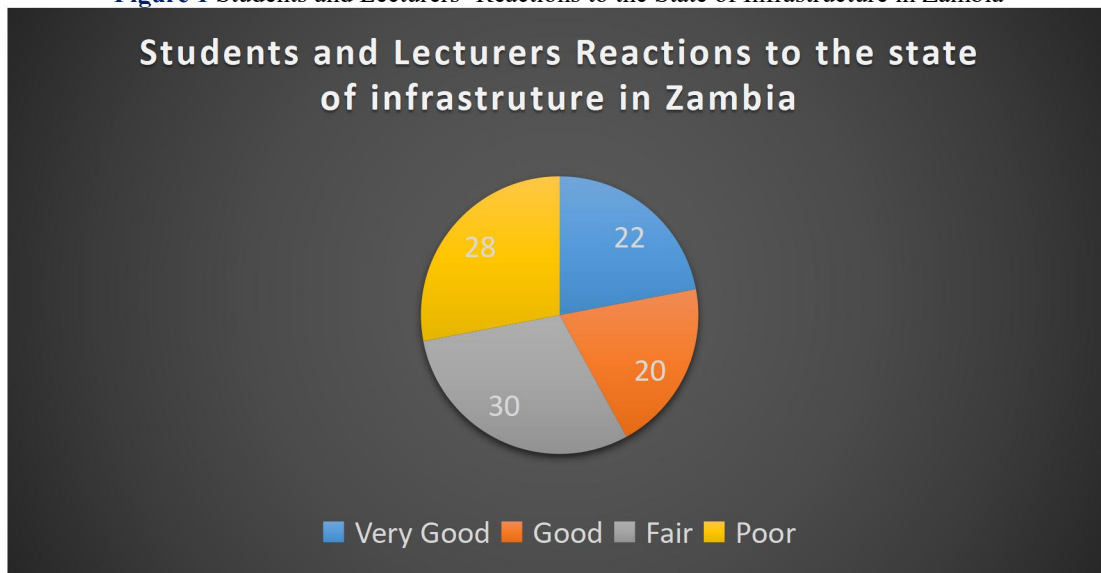
the future. The focus is on social responsibility via community development against individuals or customers. Figure 1 defines the private organization's obligation to the community outside its shareholders and employees.

## 7 RESULTS

The quality and access to infrastructure in a learning environment are the key determinants of graduates' quality. It may influence the graduates' ability to compete with their counterparts across the globe.

It was reported that the top universities that made the list of the 2022 World Best University ranking were the University of Ibadan, University of Lagos, and Covenant University, among others not within the first 400 universities. Many supporters of this argue that because of nepotism, inadequate funding of infrastructural facilities, lack of leadership insight, and corruption in the education sector, many countries in the continent that were supported and assisted during their crisis, such as South Africa and Ghana are topping the list of best universities in Africa. Findings agree with Jacob and Musa and Erezi [9]. Students and lecturers were asked on the state of infrastructure in Zambia and the following were the reaction (Figure 1).

**Figure 1** Students and Lecturers' Reactions to the State of Infrastructure in Zambia



### 7.1 The Quality and Access to Infrastructure in a Learning Environment

Infrastructure is the key determinant of graduates' quality. It may influence the graduates' ability to compete with their counterparts across the globe.

From the very beginning, it must be known that there is limited literature on the state of infrastructure in Zambian colleges and universities. Most of the articles that address this subject predominantly contain extracts from the media whose authenticity and reliability might compromise the scholarly position of the study. However, Government reports, through the media, has been a valuable resource in analysing the state of colleges and universities in Zambia [10].

Students and lecturers were asked on the state of infrastructure in Zambia and the following were the reactions according to chart 4.1.

### 7.2 Table Results

The findings above indicated that 30 percent of respondents felt that infrastructure of higher learning institutions were fair, followed by 28 percent of the participants who thought that their colleges had poor infrastructure. Only 22 percent felt that their Higher learning institutions were very good and 20. Percent said higher learning institutions in Zambia are only good. Respondents who stated that their institutions were not in a good state cited lack of qualified lecturers who could deliver to the expectation of students. Still other participants submitted that in terms of infrastructure, their colleges did not have all the necessary structures to support learning. They mentioned lack of facilities for special education students which, according to them, were discriminatory to students living with disabilities.

The research further revealed that the state of infrastructure in some higher learning institutions were good especially those institutions accredited by the Teaching Council of Zambia or Higher Education Authority and were being visited every time and then and are determined to follow standards for Higher institutions [11].

Other respondents said good funding from the Government and others sources also contributed to those institutions which had very good infrastructure not forgetting good leadership and management skills or application.

### **7.3 Sources of Funding in Higher Learning institutions**

The sources of funding for infrastructure development for higher learning institutions came from different sources. Tuition was the biggest source of funding with more than 70 percent representation followed by shareholders and donors this seemed very true especially for Private institutions. This came out after interviewing about 7 administrative personnel or officials from 7 private higher learning institutions. For Public funded institutions, mismanagement and misappropriation of funds were cited as part of the reasons why we have poor infrastructure in public higher learning institutions.

## **8 DISCUSSION**

The study established that the state of Higher Learning Institutions in Zambia both Private and Public were not good, which entails that quality service delivery was compromised. In terms of funding for infrastructure development in colleges and universities, the study revealed that the major sources of income came from tuition fees as well as bank loans. The findings showed that budgets of these colleges were not adequate to support infrastructure development. As such, it became plausible to argue that the lack of budget funds for the development of education requires a search for other sources of funding for infrastructure facilities in education. It is important, therefore, that Higher Learning Institutions partner with the business community who can fund infrastructure development

The study also established that there was a causal link between infrastructure of Higher Learning Institutions and quality academic climate.

## **9 CONCLUSION**

This paper has revealed that infrastructure development is an important part of the delivery of quality education in higher education institutions. As such, infrastructure in both private and public institutions in Zambia need a lot of attention as the study's findings attest to the fact that these institutions do not have adequate infrastructure for teaching and learning purposes. Furthermore, existing literature demonstrates, on this front, the valuable role that infrastructure plays in the delivery of quality educational whose focus is on the holistic development of the students [12].

Higher institutions' infrastructure development is central to sustainable and quality educational development and the economic competitiveness of the graduates to compete with their counterparts across the globe. Findings show inadequate infrastructure development in Zambian higher institutions [13]. This is holding Zambia's higher institutions from competing with others regarding university world ranking.

(1) The paper recommends that there should be sincerity and transparency on the part of the government if they want the proposed framework for PPP to succeed in improving public higher institutions infrastructure development via engagement of private companies and, in return, given tax relief.

(2) The paper recommends that there should be the political will and directive from relevant higher offices to support the proposed extended corporate social responsibility. The proposed framework of PPP philosophy with a focus on community development via infrastructure provision in public and higher institutions. This is one of the favourable infrastructural development practices for a paradigmatic shift from an obsolete reflection on development to the infrastructural transformation of the economy of the country.

(3) The study suggests that the robust institutional framework should be devoid of political bitterness, and there should be consultation between the private companies and the managers of higher institutions. This will enhance the institutional synergy between the public higher institutions and private companies regarding the generation and training of human capital. The policymakers should mediate to ensure that the project is completed within the time frame and handed over to the higher institutions' managers.

## **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

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