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CLASSIFICATION OF INFRASTRUCTURE

**and its role in infrastructure
Delivery.**



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INTRODUCTION

The demand for infrastructure is common in all human society. The fulfillment of the societal demands for infrastructure has been vested for several centuries on the public sector. The participation of different stakeholders in provision of infrastructure is a common discourse, however, this article delves into the rarely addressed subject matter of the essence of classification of infrastructure and the appropriate attitude to the classification for the purposes of infrastructure delivery.

INFRASTRUCTURE DELIVERY

A common factor in all human societies is the constant ever-growing demand for the development of infrastructure. Conventionally, the Public Sector is charged with the responsibility of infrastructure delivery. Several factors have impinged on the fulfillment of the responsibility by the public sector such as: corruption, lack of adequate financing, lack of requisite expertise and technical know-how.

In recent years, there has been an increased participation of private sector in infrastructure delivery due to the global recognition that the demand for infrastructure services cannot be fulfilled solely by the efforts of the public sector. This has necessitated increased attraction of private sector to infrastructure delivery. The enactment of legislations and regulations such as the ICRC Act and its Policy is as a result of the need to regulate and promote an increased involvement of private sector in infrastructure delivery. Irrespective of the stakeholder (public or private sector) involved in infrastructure delivery, there is a need for an adequate understanding of categories of infrastructure.

DEFINITION OF INFRASTRUCTURE

Infrastructure has been used as an umbrella term for many activities. Infrastructure can be defined as basic physical and organizational structures, facilities, systems needed for the operation of any given society. The development of a country's infrastructure is vital to the growth of its sectors and the overall economy. Public infrastructure refers to infrastructure facilities, systems, and structures that are owned and operated by the "public," i.e., the government. It includes all infrastructural facilities that are open to the general public for use¹.

¹ <https://corporatefinanceinstitute.com/resources/knowledge/economics/public-infrastructure/>.

The infrastructure sector primarily comprises electricity, roads, telecommunications, railways, irrigation, water supply and sanitation, ports and airports, storing facilities, and oil and gas pipelines². Access to basic infrastructure services is critical for creating economic opportunities and bringing social services to the poor³.

CLASSIFICATION OF INFRASTRUCTURE

There are various classifications of infrastructure. There are several factors upon which infrastructure is classified. The three major factors for the classification include the use, economic effect and nature of the infrastructure.

1.1 CLASSIFICATION BASED ON USE

Classification is based on the direct use the infrastructure serves. Here, infrastructure is classified on the use of the specified project. Arguably, the present classification should be rightly named examples of infrastructure as opposed to classification⁴, however, several divergent opinions⁵ classify infrastructure based on the direct use of the individual project.

- 1.1.1 Transportation infrastructure – Bridges, roads, airports, inland waterways, sea ports, tunnels, rail transport, etc.
- 1.1.2 Water and Waste infrastructure – Water supply, water resource management, dams, agriculture water distribution systems, proper sewage and drainage systems.
- 1.1.3 Health infrastructure – hospitals, ambulances, clinics, testing centers, laboratories, etc.

² What is Infrastructure Development? Retrieved from <https://www.igi-global.com/dictionary/the-impact-of-infrastructure-on-growth-and-development/59129>

³ Infrastructure Overview Retrieved from <https://www.worldbank.org/en/topic/infrastructure/overview>

⁴ <https://corporatefinanceinstitute.com/resources/knowledge/economics/public-infrastructure/>.

⁵ <https://www.aboutcivil.org/infrastructure-types>.

- 1.1.4 Communications infrastructure – Telephone network, broadband, masts
- 1.1.5 Power and energy infrastructure – Power distribution grid networks, power stations, wind turbines, gas pipelines and solar panels.
- 1.1.6 Recreational infrastructure –gardens, beaches, ornamental structures, natural reserves parks and play grounds.
- 1.1.7 Educational infrastructure – schools, public training institutes.

1.2 **BASED ON THE NATURE**

- Classification is based on the general nature and attribute of the given infrastructure. The classes are determined by the existence of physical structures or institutions systems the given project.
- - 1.2.1 Soft infrastructure can be defined as all institutions contributing to the existence of a healthy economy. Soft Infrastructure depend greatly on extensive human capital. They are also service-oriented. Soft infrastructure includes all institutions crucial to the well-being of an economy such as educational, health, financial, law enforcement, governmental systems.
 - - 1.2.2 Hard infrastructure refers to all physical structures crucial to development of a modern and industrialized economy. These infrastructure refer to the physical buildings, bridges, roads, highways, railways telecommunication structures, drainages and telecommunication services that exist within a given economy.⁶

1.3 **BASED ON THE ECONOMIC EFFECT**

⁶ <https://corporatefinanceinstitute.com/resources/knowledge/economics/public-infrastructure/>

The major classification of infrastructure is the role played by the infrastructure in the economy. The majorly used classification is based on the role of the infrastructure in the development of infrastructure which is divided into three major areas:

1.3.1 **Economic Infrastructure:**

- Economic infrastructure can be defined as facilities, systems, institutions, activities and services channeled towards the operation and development of other sectors of the economy. Economic infrastructure refers to the basic facilities which directly benefit the process of production and distribution in an economy⁷. Economic Infrastructure is directly linked to the economic development of a nation. The goal of economic infrastructure is the achievement of increased productivity levels in sectors of the economy.
- Economic Infrastructure include but not limited to transportation infrastructure (Roads, Bridges, Rails, airport, ports), Power transmission Systems, Telecommunications, Oil and Gas infrastructure and agriculture infrastructure.

1.3.2 **Social infrastructure:**

Social Infrastructure can be defined as the basic services, facilities, institutions and activities that improve individual productivity and aid the achievement of social objectives. Social Infrastructure contributes indirectly to the country's economic development.

The indirect impact of social infrastructure on the economy can be illustrated with the health care sector which has little or no direct impact on the economy but a vibrant health care sector has several benefits indirectly to the economy including the influx of medical tourists and a healthy work force. Examples include educational institutions, health care facilities, social housing, prisons, portable water systems, cultural Institutions and waste management systems.

⁷ Retrieved from <https://nptel.ac.in/content/storage2/courses/109106089/module%201.pdf>

1.3.3 **Commercial Infrastructure:**

Commercial Infrastructure refers to facilities, activities, services and institutions for the primary purpose of maximization of profits. The development of the infrastructure is not focused on the productivity of an individual or the advancement of a sector of the economy, rather it focuses on profit making. Certain examples of commercial infrastructure include malls, hotels, halls and luxury housing.

ESSENCE OF CLASSIFICATION OF INFRASTRUCTURE

In the constant discussion revolving around Public Private Partnerships and Infrastructure Delivery, there is hardly any in-depth analysis on the classification of infrastructure, ironically, as the provision of infrastructure and service delivery is the foundation upon which any such partnership can be formed. Where there exists a lack of understanding as to the proper categorization of Infrastructure, the government becomes swayed by every attempt of the Private Sector to participate in the development of an Infrastructure without the key consideration of the category of infrastructure alongside the role they serve in the achievement of the overall blueprints for development. In summary, the essence of classification of infrastructure are:

- Streamline governmental projects to pursue goals and objectives according to the classification in need of development
- Enable government solve their immediate and long-term goal needs. For instance, while developing countries may have the immediate need of the development of economic and social infrastructure, developing nations may have the need for the advancement of existing economic infrastructure.
- Provision of varying alternatives for the fulfillment of general projects. Thus where government is interested in the development of a particular category of infrastructure, an understanding of such classification enables government to examine various alternatives for the fulfilment of their desired choices.

APPROPRIATE ATTITUDE TO CLASSIFICATION OF INFRASTRUCTURE

There are several debates on the category of infrastructure that should be given more priority in a given society. It is pertinent to restate that determination of the category for investment should be based on the identification of the needs of the society and the understanding of how the particular infrastructure can achieve the given societal needs.

A major problem which has reflected in several failed infrastructure projects is the difficulty in government's selection of the right projects⁸. This major difficulty is rooted in the failure to fully understand the classification of infrastructure and their effects on the economy vis-a-vis the achievement of the desired governmental goals.

There is need for a brief distinction on the needs of developed and developing nations. Analyzing infrastructure investment in developing countries is a challenging task due to the lack of systematic and comparable data.⁹ However, the limited data available portrays a large share of public investment is expended on economic infrastructure including transportation, power, communication etc.¹⁰ Factually, the governments of developing nations are propelled towards achievement of economic infrastructure development in a bid to achieve economic growth. This often results in a neglect for social infrastructure, thereby detrimentally affecting the living conditions of residents.

⁸Bielenberg, A et al 2020. McKinsey & Company-Four ways governments can get the most out of their infrastructure projects <https://www.mckinsey.com/industries/public-sector/our-insights/four-ways-governments-can-get-the-most-out-of-their-infrastructure-projects#>

⁹ <https://journals.openedition.org/poldev/2802>.

¹⁰ Trends and Challenges in Infrastructure Investment in Developing Countries

Daniel Gurara, Vladimir Klyuev et al retrieved from <https://journals.openedition.org/poldev/2802>.

On the other hand, developed countries due to more availability of funds have the capacity to focus on the development of several categories of infrastructure without the neglect of a particular category. For instance, while developing countries have expressed reluctance to engage in environmental Infrastructure (a category of social infrastructure)¹¹, infrastructure for research and development, scientific and technological advancement, developed countries tend to invest high amount of resources to promote such infrastructure development. A typical example can be portrayed in the Nigerian government support of the development of oil refineries¹² while several governments such as Germany¹³, Norway, Israel¹⁴ are constantly developing infrastructure to aid in the phasing out of the over-reliance on crude oil and fossil fuels.

Notably the category commercial infrastructure is one where both governments of developing and developed nations are to exercise caution. The nature of commercial infrastructure is such that infrastructure is invested for profit maximization. Profit maximization of a solely owned public infrastructure is often discouraged as government in the provision of infrastructure is to gear towards service delivery and not profit making. Several projects have failed to achieve their goals where the prices are not affordable for the members of the society.

A typical example is seen in the Ultra modern market built in Tejuosho, Lagos State Nigeria, wherein most stalls in the facility have not been let out due to the high rents charged by agents¹⁵. The situation is worsened by the fact that several petty traders hawk their goods and use make shift stalls around the Mall while the mall is relatively empty. The reason for its failure is not far-fetched, in the implementation of the project, the high fees resulted in converting the

¹¹ Green Growth and Developing Countries CONSULTATION DRAFT page 12 retrieved from <https://www.oecd.org/dac/environment-development/50559116.pdf>.

¹² <https://www.ogj.com/refining-processing/article/14071477/nigerias-government-to-support-dangote-integrated-refining-complex>

¹³ <https://www.cleanenergywire.org/factsheets/germanys-dependence-imported-fossil-fuels>.

¹⁴ <https://www.thestreet.com/video/fossil-fuels-eliminated-in-these-countries#:~:text=Here%20are%20some%20of%20them,fuel%20vehicles%20starting%20in%202030>.

¹⁵ <https://guardian.ng/sunday-magazine/beautiful-tejuosho-market-yet-to-seduce-traders-shoppers/>

socio-economic infrastructure to a commercial infrastructure for profit maximization, thereby making it unable to achieve its purpose of provision of stores for the local traders to facilitate the ease of doing business and organize the rowdy market. Unfortunately, the failure to effectively execute and implement a project with the understanding of the appropriate category of infrastructure resulted in a beautiful and empty ultra modern market and a rowdy environment filled with hawkers roving around.

A number of Public Private Partnerships have become a futile action as they were entered into merely under the guise of the provision of infrastructure with insufficient understanding that not all categories of infrastructure can achieve the particular goals of the government. The federal government's PPP programme embraces the creation of new infrastructure, and the expansion as well as the refurbishment of existing assets and does not attempt to prioritize a category of infrastructure over the other. Therefore, any category of infrastructure that may benefit from a PPP can be subject to one¹⁶. These categories are power generation plants and transmission or distribution networks; roads and bridges; seaports; airports; railways; educational facilities; urban transport systems; housing; healthcare facilities, water supply, treatment and distribution systems; and solid waste management.

Needs of each nation, goals of the government and availability of funds should be the principal considerations in choosing the category of infrastructure for investment. Also, it is advisable that governments while conducting feasibility studies should analyse the category of infrastructure where the particular project falls under and consider whether that category is the immediate need of the society and to determine the priority to be placed on suggested projects.

¹⁶ Etomi, G. et al 2019. Public Private Partnerships in Nigeria. Retrieved from <https://www.lexology.com/library/detail.aspx?g=dabbe5fb-ffae-4504-9c55-b7b86e07207b>

CONCLUSION

In conclusion while government in developed nations can decide to focus solely or mainly on a given category, it is ill advice for a developing nation to do same. The diverse and pressing needs of a developing nation requires that there is constant development of various categories of infrastructure in a bid to accelerate the conditions of living and the economic situation in the country.

There is no universal rule that determines what category of infrastructure better serves a given demographic. Neither is there any category of infrastructure that has no demand, rather government must focus on the category or combination of categories that reflects its greatest needs. The unending debate on the classification of infrastructure more deserving of funding can only be answered by a thorough understanding of the classification of infrastructure and the needs of the society in question.