



Infrastructure Efficiency and Effectiveness: The Urban Planner's Perspective

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Abstract: Infrastructure which is the live line of any settlement plays an important role in the existence of both plant and animal's lack of infrastructural faculties in any settlement leads to problems ranging from health and sanitation poverty and unemployment etc. the role of urban planner in ensuring infrastructure, utility, efficiency and effectiveness is broken into three categories which are the role in new settlement, existing settlement and regional settlement. In ensuring infrastructure utility efficiency and effectiveness specific planning standard using either population or distance criteria are used. Some of the problems associated with efficiency and effectiveness of infrastructure in the developing nation are planning, finance, and implementation. The solution to these problems are privatization, participatory planning and the use of appropriate technology. No doubt the difference between the developed nation and the developing nation is infrastructure, utility efficiency and effectiveness.

Key words: Efficiency, Effectiveness, Infrastructure, Urban Planner.

1.0 INTRODUCTION

Infrastructure which is the life line of any settlement, it plays a very vital role both in existing and new settlements. Settlements lacking infrastructure have the likely hood of having diversified problems which hindrance the existence of both plants and animals. Some of the problems associated with lack of infrastructure can lead to poor health and high mortality. Where there are no clinic or hospital available, or where lack roads or bridges makes them inaccessible people cannot access the medical service that they require to be healthy and productive. Lack of infrastructure also leads to lack of employment by acting as disincentives to investment. Companies who struggle to produce and sell goods in an area with inadequate roads, electricity or water supply do not want to set up the factories or business that could potentially generate employment, improve living

standard and reduce poverty. Lack of adequate infrastructure perpetuates poverty because it denies possibilities. Hunger one of the most obvious systems of distance from food. When people live far away from food source, food security depends on infrastructure that ensures food can be transported in an efficient and cost effective way (Alan, 2008).

Infrastructure provides access to water and sanitation facilities are also key to good health, tube well or piped water are needed for people to drink , cook and bath. Sanitary toilet facilities are required to prevent the spread of bacteria and disease. (A villager in Mozambique explains “the most dangerous thing is that cholera has always appeared during the raining season and it is then that the river is in spate and boats cannot cross.” The answer to treating cholera in this case is not medicine or doctor, it is a bridge. That is going by the villager, but to the urban planner who is pursuing infrastructure efficiency the answer will be clean and safe drinking water as well as sanitation.

The distinction between the developed nation and the under developed ones is the efficiency and effectiveness of the infrastructural facilities and service in the two nations. Development is always associated with availability and functionality of infrastructural facilities in place. In the developed countries/ nations efficiency and effectiveness in service provided have gone or been linked to every nooks and crannies of the countries so much that the citizen of these nations feel that it is part and parcel of their community which is not in the developing nations where citizens and governments are still trying to put in place these infrastructural facilities not talking of its efficiency and effectiveness. A good examples of developed nations where urban planning is been practised for long is the Great Britain and no doubt that the role of the urban planners in pursuing infrastructure efficiency and effectiveness in the country has been felted for a very many years. An example of the urban planners work in ensuring infrastructure efficiency and effectiveness is the city gate project where more sophisticated infrastructure such as the subway system of mass transportation is been.

The aim of the seminar is to identify the role of urban planners in ensuring infrastructure efficiency and effectiveness. It will be achieved through identifying the problems associated with lack of efficient and effective infrastructure, identifying the roles played by urban planners in ensuring the efficiency and effectiveness of infrastructural facilities, identifying the problems associated with making infrastructure efficient and effective and finding solution to the problems.

2.0 ROLES OF URBAN AND REGIONAL PLANNING IN INFRASTRUCTURE AND UTILITY EFFICENCY/ EFFECTIVENESS.

Urban planners are usually hired by developer's private property owner's private planning firms and local, regional government to assist in the large- scale planning of communal and commercial developments as well as public facilities and transportation system. Urban planner in the public role often assist the public and serve as valued technical advisor in the myriad web of the community political environment related discipline include regional ,city, environmental, transportation, housing community and cultural planning. The roles of the urban planner in infrastructure, utility efficiency and effectiveness are broken into the following types of levels this are the: (i) New settlements

(ii) Existing settlements

(iii) Regional settlement.

- (i) **New settlements:** The pursuit of urban and regional planner in infrastructure, utilities efficiency and effectiveness in new settlements starts from the division of large parcel of land into plots this process is usually known as layout design (residential, commercial, industrial etc). The principal infrastructure used in dividing this parcel of land into segments is the road network in trying to ensure efficiency and effectiveness in the volume of traffic these roads carries the urban planner has different categories of road network ranging from primary, secondary district access/path with size such as 12m, 18m 24m 50m etc see table 1. The urban planner takes into consideration the anticipated volume of traffic to be generated by the threshold population he is planning for in the new town or settlements. These networks of roads are not just put in place but rather certain criteria which ensure it efficient use are also considered such as avoiding cross junctions sharp bends and long stretch of roads all in an attempt of reducing accidents to the lowest level. Just like the road network all other infrastructural facilities are computed having in mind the population of the proposed settlement and projection are made into the future with anticipated growth rate usually with a span of years gap given for example a ten year development plan of a proposed settlement can be computed with the threshold population as the base for the projection into the anticipated increase in the size of the settlement in the future.

Table1. **Standard for urban road system**

Types of road	Road reservation (meters)	Types of lanes (meters)	No. of lanes	Width of lanes	Divide width (metres)	Width (metres)
Express way	90	Dual	4-6	3.7	3.0-5.0	
Primary road	90	Dual	4-6	3.7	3.0-5.0	
Secondary road	40-60	Dual	2-4	3.7	1.8-2.5	3.0-5.0
Distributor road	18-25	Single	2	3.4-3.7	-	1.8-3.0
Access road	12-15	Single	2	3.4-3.7	-	1.8-3.0
Cul-de-sac	11	Single	2	3.1-3.4	-	1.5-1.8

Source: Obateru, (1986) Uloko and Agbonuga, (2005)

- (ii) **Existing settlements:** In many communities, growth and development has brought problems related to infrastructure. Growth affects the cost of infrastructure, demand and efficiency. The role of urban planner in ensuring that infrastructural facilities are efficient and effective in communities cannot be over emphasised. The role start in existing communities by identifying infrastructure in the settlement, under taking studies on the need assessment of communities with regards to infrastructure taking the population of the community comparing them with existing infrastructure facilities using specific planning

standards to ascertain whether the available infrastructures facilities tally with the population it serve, this way the urban planner can know the depicts of infrastructure facilities in communities. The role do not even stop at that , but rather goes be young to see how best this infrastructural facilities can be used to achieve the maximum output expected of it. For example, water is one important infrastructure that is required by any settlement or community, the urban planner in ensuring it availability , efficiency and effectiveness start by identify the source, the best method of harnessing it, how to connect every home/ building and computing even the total requirement of this essential infrastructure (i.e. consumption per capita). This applies to all the infrastructural facilities in the every community or settlement.

Table2 Site and access standard for neighbourhood facilities and services

Neighbourhood facilities and services	Site area (hectare)	Maximum service radius (meter)
Nursery school	0.8-1.6	400
Nursery primary school	1.6-3.2	400-800
Civic centre	0.8-1.6	800
Shopping centre or market	1.6-4.0	800
Retail shops	0.05-0.1	100-150
Neighbourhood playground	1.6-2.4	400-800
Neighbourhood park	0.8-2.4	400-800
Children's playground	0.2-0.5	100-150
Health centre	0.4-0.6	800
Place(s) of worship	0.3-0.4	800
Postal agency	0.1-0.2	800
Police post	0.2-0.4	800
Commercial bank	0.3-0.4	800
Petrol filling station	0.3-0.4	800
Refuse deport	0.2-0.4	400-800
Service industries	2.0-3.0	1,600
Cemetery	1.0-1.5	1,600

Source: Adapted from Obateru (1986, 2003) Uloko and Agbonuga (2005)

(iii) Regional settlement: The pursuit of urban planner in ensuring efficient and effective infrastructure and utility is not restricted to a single community or neighbourhood but rather to group of community/ settlements which is otherwise referred to as a regions here in ensuring that infrastructure and utility are effective and efficient certain facilities which require large population are proposed using the various regional planning concepts depending on the concept which suits the regions collective infrastructural facilities which link more than two or more settlements are proposed in a manner in which efficiency and effectiveness is achieved. Example of regional infrastructure includes the regional water supply from dams which serves more than one settlements. Planning for the efficient and effective utilization of this infrastructure is not only restricted to the primary purpose but

rather other uses such as irrigation agriculture, fishing etc which can go side by side with the primary purpose which is providing adequate safe drinking water to the communities.

Another regional infrastructural facility is the road which links communities in ensuring effective and efficient infrastructural facilities usage the urban planner identifies settlement with potential benefit in terms of either population, agricultural potentialities, mineral resources etc are link to consumption areas. Electricity which is another important infrastructural facility is transmitted from the generation stations to various settlements/communities using cables which span long distance branching in settlements all in an attempt to ensure that efficiency is achieved. The urban planner compute the electricity requirement of settlement, the size and amount of transformers required to make the supply effective and efficient. These are some of the few regional infrastructures, utility. All others not mention have planning standard of ensuring efficiency and effectiveness.

Regional planning standards

s/no	Population	Facilities	number	Area in SQM
1	5,000	Dispensary	1	2,000
		Convenience shopping	1	1,000
		Parking area	1	5,000
		Postal agency	1	400
		Play ground	1	5,000
		Police post	1	400
		Bore hole	1	60
2	10,000	Comprehensive health centre	1	5,000
		Senior secondary school	1	6,000
		Religious building	2	400
		Electric substation 11kva	1	2,000
		Post office	1	400
		Community hall	1	2,000
		Local shopping	1	3,000
		Police station	1	400
		Service market	1	2,000
		Taxi stand	2	60
		Parks	1	10,000
		Play ground	1	10,000
		Water tank/ reservoir	1	2,000
		Waste collection/ treatment facility	1	2,000
3	1,000,000	Specialist hospital 200 bed	1	5,000
		Veterinary hospital	1	3,000
		Psychiatric hospital	1	2,000
		Electric substation 66kva	2	10,000
		Community park	1	50,000

		Bus terminal (car park)	1	1,000
		Waste water treatment	As per required	
		Multipurpose park/ ground	1	20,000
		Post office	1	400
		Police station	2	1,000
4	5,000,000	Teaching hospital 500bed	1	25,000
		Veterinary hospital	1	2,000
		University/ polytechnic/college	3	100,000
		Police station	3	1,000
		Fire station 5 to 7 km radius	3	10,000
		Adult education centre	1	1,000
		Electric substation 220kva	1	40,000
		Service market	1	60,000
		Bus terminal	1,	2,000
		District park	1	10,000
		Ceremonial ground	1	10,000
		Post office	2	5,000
5	Zonal / sub city	Medical college	1	As per required
		Nursing and paramedic institution	1	2,000
		Telephone exchange	1	2,500
		Sub city whole sale market	1	150,000
		Post office	1	2,500
		Multipurpose ground	1	80,000
		Divisional sport centre	1	300,000
		Bus deport	As per required	
			1	10,000

Adopted from Kadyali 2005 and Delhi urban area regional plan (2012)

3.0 Problems associated with ensuring infrastructure efficiency and effectiveness

3.1 Planning: planning is concerned with deliberately achieving some objectives, and it proceeds by assembling actions into some orderly sequence. In trying to ensure efficiency and effectiveness of infrastructure detailed analysis of situation must be made from what is obtained in the past to the present and possible into the future in terms of infrastructure requirement of settlement this is always a big problem especially in the especially in the developing countries where these series of activity in planning is difficult to achieve. Sometimes the activity may be in order but before the programme is implemented the projected period of development may be over so change in the target population will occur and hence not achieving the efficiency and effectiveness of the service to be provided by the infrastructural facilities.

3.2 Finance: provision and maintainers of infrastructure facilities is the responsibility of the government especially in the developing countries where the resource is limited or scares and these infrastructural facilities require huge capital to be place. Sometimes the infrastructures may be in place but resource to maintain them will be a problem which leads to inefficient and ineffective infrastructure service/facility delivery.

3.3 Implementation: Another hindrance to infrastructure efficiency and effectiveness is the implementation stage as project which have direct bearing to human development are not implemented either because of political reason or in some case the project may be on course by the previous government and abundant by the government of the day.

4.0 Solution to infrastructure efficiency and effectiveness

4.1 Privatisation: transferring ownership of public service from public sector (government) to private sector to operate for a profit or to non profit organisation. Some to be the solution to efficient and effective delivery of infrastructural service, this is more important in the developing nations where scares resource are competing for unlimited demands. A good example of privatisation is in the mobile telecommunication sector of Nigeria which has relatively succeeded.

4.2 Participatory planning: can result in programmes that are better and more efficient. By consulting the poor and giving voice to their concern and needs the resulting action are more likely to be relevant and appropriate to the conditions they face.

4.3 Use of appropriate technology: Taping local technology in the installation and maintainers of infrastructure, utility facilities and service will in no small way help in ensuring the efficiency and effectiveness solving the problem that way appropriate technology which are hard to find especially after installation i.e. for maintains of the infrastructural facilities.

5.0 Conclusion

The purists of the Urban and Regional Planner is mainly ensuring infrastructure, utility efficiency and effectiveness as all other roles are by extension linked to it, this because the efficiency and effectiveness of infrastructure leads to a liveable settlement, because water which is an example of an infrastructure is life as without it existence is not possible, it also leads to aesthetics in settlement road which is another examples of infrastructure is the first and gateway of archiving aesthetics quality of settlement especially when layout properly with interconnection within and among the various land uses in a settlement. The efficiency and effectiveness of infrastructure in a settlement enhances the security of the settlement with adequate lighting night crime can reduce to minimal; with layout road network surveillance is made easy. Another infrastructure aspect of infrastructure efficiency is in the provision of employment and reduction of poverty with infrastructure economy activities are made easy adequate energy for production of goods, efficient and effective road network makes transportation of goods and services. When infrastructure is access in every home then equality among the citizens of settlement is archived. When the low income earner pays for water/electricity bill just as the higher income earner in the

community then social justices is archived. These are some among the connection between the other purists of urban planner and infrastructure efficiency and effectiveness.

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