

SPEECH DELIVERED BY DR. OLANREWAJU TOWRY-COKER PHD ON
“INFRASTRUCTURE- “KEY CHALLENGE FOR SMEs” AT THE ENTERPRISE
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INTRODUCTION:

Thank you distinguished ladies and gentlemen for inviting me as a guest speaker. In the invitation letter, Mr. Peter Bankole, on behalf of the Enterprise development Centre (EDC) said the invitation was based on my vast experience as a renowned Architect.

Naturally, being of a humble disposition, I cannot but agree with him. When you talk about the EDC becoming a fast and major player in the SMEs development space. I can honestly say the letter of invitation was the first time I heard about the EDC.

It is therefore distinguished ladies and gentlemen, my honour and privilege to give the talk. I don't want to call it a speech because, when I listen to speeches, I often fall asleep. Except when I listen to Dr. Micheal Omolayole because he is the one of the best joke tellers around.

Now to the subject matter: **Infrastructure, a key challenge to SMEs.**

In my book, published in June, 2011, titled *“Housing Policy and the dynamics of Housing delivery in Nigeria- A case study of Lagos”* Infrastructure or rather the lack of it was one of the key reasons for the overwhelming inadequacy of affordable housing for Nigerians and In particular, Lagos Residents.

You cannot separate Infrastructure from Small and Medium-scale Enterprises (SMEs). Simply because without infrastructure, SMEs or even large companies will find it hard to survive.

In the course of my investigation of this topic, I asked around and researched. I found out that there are two type of infrastructure: *hard and soft infrastructures*. SMEs, most people know what they are but to my mind, infrastructure is everything. I've extended the definition of infrastructure not just to include health which is a standard concomitant to what is normally under the definition of infrastructure but also include to *Nutrition*. You may be surprised and say to yourself what is this guy is talking about. I will tell you why from my point of view, nutrition, is part of infrastructure. It is because if a child grows up without proper nutrition from infancy to his teen. It is a world known medical fact that the cerebral development of the child will not be on par with a child that had good nutrition from an early age and medium level to his teens.

Investing in People: Helping Nigeria address the fundamental health and education needs of its citizens directly impacts governance, stability, and economic growth. Nigeria ranked 70 out of 71 countries in the 2008 Report on the State of the World's Mothers Mortality. The national average maternal mortality is about 800 per 100,000 live births, but the rate is at least three times higher in the northern states.

DEFINING INFRASTRUCTURE.

Infrastructure is actually a French word and the English merely borrowed it. It is completely French and was first used in France in relation to substructure in the early 20th Century. In fact it is very new in the lexicon of the English language. As an aside, you know that the English are very smart to the extent that 60% of the words in English are either French or of French origin for instance, there is still no English word for *coup d'état* except to shorten it and call it coup.

Infrastructure includes the following:

Infrastructure is basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. It can be

generally defined as the set of interconnected structural elements that provide framework supporting an entire structure of development.

The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, electrical grids, telecommunications, and so forth, and can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions."

Viewed functionally, infrastructure *facilitates* the production of goods and services, and also the distribution of finished products to markets, as well as basic social services such as schools and hospitals; for example, roads enable the transport of raw materials to a factory. In military parlance, the term refers to the buildings and permanent installations necessary for the support, redeployment, and operation of military forces.

According to the *Online Etymology Dictionary*, the word infrastructure has been used in English since at least 1927, originally meaning "The installations that form the basis for any operation or system".

Other sources, such as the *Oxford English Dictionary*, trace the word's origins to earlier usage, originally applied in a military sense. The word was imported from French, where it means *subgrade*, the native material underneath a constructed pavement or railway. The word is a combination of the Latin prefix "infra", meaning "below", and "structure". The military use of the term achieved currency in the United States after the formation of NATO in the 1940s, and was then adopted by urban planners in its modern civilian sense by 1970.

The term came to prominence in the United States in the 1980s following the publication of *America in Ruins*, which initiated a public-policy discussion of the nation's "infrastructure

crisis", purported to be caused by decades of inadequate investment and poor maintenance of public works. This crisis discussion has contributed to the increase in infrastructure asset management and maintenance planning in the US.

That public-policy discussion was hampered by lack of a precise definition for infrastructure. A US National Research Council panel sought to clarify the situation by adopting the term "public works infrastructure", referring to:

"... both specific functional modes – highways, streets, roads, and bridges; mass transit; airports and airways; water supply and water resources; wastewater management; solid-waste treatment and disposal; electric power generation and transmission; telecommunications; and hazardous waste management – and the combined system these modal elements comprise. A comprehension of infrastructure spans not only these public works facilities, but also the operating procedures, management practices, and development policies that interact together with societal demand and the physical world to facilitate the transport of people and goods, provision of water for drinking and a variety of other uses, safe disposal of society's waste products, provision of energy where it is needed, and transmission of information within and between communities."

"HARD" VERSUS "SOFT" INFRASTRUCTURE

In this article, "hard" infrastructure refers to the large physical networks necessary for the functioning of a modern industrial nation, whereas "soft" infrastructure refers to all the institutions which are required to maintain the economic, health, and cultural and social standards of a country, such as the financial system, the education system, the health care system, the system of government, and law enforcement, as well as emergency services.^{[7][11][12]}

Types of hard infrastructure

The following list of hard infrastructure is limited to capital assets that serve the function of conveyance or channelling of people, vehicles, fluids, energy, or information, and which take the form either of a network or of a critical node used by vehicles, or used for the transmission of electro-magnetic waves.

Infrastructure systems include both the fixed assets, and the control systems and software required to operate, manage and monitor the systems, as well as any accessory buildings, plants, or vehicles that are an essential part of the system. Also included are fleets of vehicles operating according to schedules such as public transit buses and garbage collection, as well as basic energy or communications facilities that are not usually part of a physical network, such as oil refineries, radio, and television broadcasting facilities.

Transportation infrastructure

- Road and highway networks, including structures (bridges, tunnels, culverts, retaining walls), signage and markings, electrical systems (street lighting and traffic lights), edge treatments (curbs, sidewalks, landscaping), and specialized facilities such as road maintenance depots and rest areas
- Mass transit systems (Commuter rail systems, subways, tramways, trolleys and bus transportation)
- Railways, including structures, terminal facilities (rail yards, train stations), level crossings, signalling and communications systems
- Canals and navigable waterways requiring continuous maintenance (dredging, etc)
- Seaports and lighthouses

- Airports, including air navigational systems
- Bicycle paths and pedestrian walkways
- Ferries

For canals, railroads, highways, airways and pipelines see Grübler (1990), which provides a detailed discussion of the history and importance of these major infrastructures

Energy infrastructure

- Electrical power network, including generation plants, electrical grid, substations, and local distribution.
- Natural gas pipelines, storage and distribution terminals, as well as the local distribution network. Some definitions may include the gas wells, as well as the fleets of ships and trucks transporting liquefied gas.
- Petroleum pipelines, including associated storage and distribution terminals. Some definitions may include the oil wells, refineries, as well as the fleets of tanker ships and trucks.
- Specialized coal handling facilities for washing, storing, and transporting coal. Some definitions may include Coal mines.
- Steam or hot water production and distribution networks for district heating systems. Similar for district cooling systems as in Reston Virginia.
- Electric vehicle networks for charging electric vehicles.

Coal mines, oil wells and natural gas wells may be classified as being part of the mining and industrial sector of the economy, not part of infrastructure.

Water management infrastructure

- Drinking water supply, including the system of pipes, storage reservoirs, pumps, valves, filtration and treatment equipment and meters, including buildings and structures to house the equipment, used for the collection, treatment and distribution of drinking water
- Sewage collection, and disposal of waste water
- Drainage systems (storm sewers, ditches, etc)
- Major irrigation systems (reservoirs, irrigation canals)
- Major flood control systems (dikes, levees, major pumping stations and floodgates)
- Large-scale snow removal, including fleets of salt spreaders, snow-plows, snowblowers, dedicated dump-trucks, sidewalk plows, the dispatching and routing systems for these fleets, as well as fixed assets such as snow dumps, snow chutes, snow melters
- Coastal management, including structures such as seawalls, breakwaters, groynes, floodgates, as well as the use of soft engineering techniques such as beach nourishment, sand dune stabilization and the protection of mangrove forests and coastal wetlands.

Communications infrastructure

- Postal service, including sorting facilities
- Telephone networks (land lines) including telephone exchange systems
- Mobile phone networks
- Television and radio transmission stations, including the regulations and standards governing broadcasting
- Cable television physical networks including receiving stations and cable distribution networks (does not include content providers or "networks" when used in the sense of a specialized channel such as CNN, MTV, Sky etc)

- The Internet, including the internet backbone, core routers and server farms, local internet service providers as well as the protocols and other basic software required for the system to function (does not include specific websites, although may include some widely-used web-based services, such as social network services and web search engines)
- Communications satellites
- Undersea cables
- Major private, government or dedicated telecommunications networks, such as those used for internal communication and monitoring by major infrastructure companies, by governments, by the military or by emergency services, as well as national research and education networks
- Pneumatic tube mail distribution networks

Solid waste management

- Municipal garbage and recyclables collection
- Solid waste landfills
- Solid waste incinerators and plasma gasification facilities
- Materials recovery facilities
- Hazardous waste disposal facilities

Earth monitoring and measurement networks

- Meteorological monitoring networks
- Tidal monitoring networks
- Stream Gauge or fluvimetric^[15] monitoring networks
- Seismometer networks

- Earth observation satellites
- Geodetic benchmarks
- Global Positioning System
- Spatial Data Infrastructure

Types of Soft infrastructure

Soft infrastructure includes both physical assets such as highly specialized buildings and equipment, as well as non-physical assets such as the body of rules and regulations governing the various systems, the financing of these systems, as well as the systems and organizations by which highly skilled and specialized professionals are trained, advance in their careers by acquiring experience, and are disciplined if required by professional associations (professional training, accreditation and discipline).

Unlike hard infrastructure, the essence of soft infrastructure is the delivery of specialized services to people. Unlike much of the service sector of the economy, the delivery of those services depend on highly developed systems and large specialised facilities or institutions that share many of the characteristics of hard infrastructure. Take for instance observatories.

Governance infrastructure

- The system of government and law enforcement, including the political, legislative, law enforcement, justice and penal systems, as well as specialized facilities (government offices, courthouses, prisons, etc), and specialized systems for collecting, storing and disseminating data, laws and regulation
- Emergency services, such as police, fire protection, and ambulances, including specialized vehicles, buildings, communications and dispatching systems

- Military infrastructure, including military bases, arms depots, training facilities, command centers, communication facilities, major weapons systems, fortifications, specialised arms manufacturing, strategic reserves

Economic infrastructure

- The financial system, including the banking system, financial institutions, the payment system, exchanges, the money supply, financial regulations, as well as accounting standards and regulations
- Major business logistics facilities and systems, including warehouses as well as warehousing and shipping management systems
- Manufacturing infrastructure, including industrial parks and special economic zones, mines and processing plants for basic materials used as inputs in industry, specialized energy, transportation and water infrastructure used by industry, plus the public safety, zoning and environmental laws and regulations that govern and limit industrial activity, and standards organizations. Strategic energy reserves.
- Agricultural, forestry and fisheries infrastructure, including specialized food and livestock transportation and storage facilities, major feedlots, agricultural price support systems (including agricultural insurance), agricultural health standards, food inspection, experimental farms and agricultural research centers and schools, the system of licencing and quota management, enforcement systems against poaching, forest wardens, and fire fighting. Strategic food reserves.

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- *Social infrastructure*
- The health care system, including hospitals, the financing of health care, including health insurance, the systems for regulation and testing of medications and medical procedures, the system for training, inspection and professional discipline of doctors and other medical professionals, public health monitoring and regulations, as well as coordination of measures taken during public health emergencies such as epidemics
- The educational and research system, including elementary and secondary schools, universities, specialised colleges, research institutions, the systems for financing and accrediting educational institutions
- Social welfare systems, including both government support and private charity for the poor, for people in distress or victims of abuse

Cultural, sports and recreational infrastructure

- Sports and recreational infrastructure, such as parks, sports facilities, the system of sports leagues and associations
- Cultural infrastructure, such as concert halls, museums, libraries, theatres, studios, and specialized training facilities. Art galleries, concert halls and auditoria.
- Business travel and tourism infrastructure, including both man-made and natural attractions, convention centers, hotels, restaurants and other services that cater mainly to

tourists and business travellers, as well as the systems for informing and attracting tourists, and travel insurance

Uses of the term

Engineering and construction

Engineers generally limit the use of the term "infrastructure" to describe fixed assets that are in the form of a large network, in other words, "hard" infrastructure. Recent efforts to devise more generic definitions of infrastructure have typically referred to the network aspects of most of the structures, and to the accumulated value of investments in the networks as assets. One such effort defines infrastructure as the network of assets "where the system as a whole is intended to be maintained indefinitely at a specified standard of service by the continuing replacement and refurbishment of its components"

Civil defense and economic development

Civil defense planners and developmental economists generally refer to both hard and soft infrastructure, including public services such as schools and hospitals, emergency services such as police and fire fighting, and basic financial services.

Military

Military strategists use the term infrastructure to refer to all building and permanent installations necessary for the support of military forces, whether they are stationed in bases, being deployed or engaged in operations, such as barracks, headquarters, airfields, communications facilities, stores of military equipment, port installations, and maintenance stations.

Critical infrastructure

Critical infrastructure

The term *critical infrastructure* has been widely adopted to distinguish those infrastructure elements that, if significantly damaged or destroyed, would cause serious disruption of the dependent system or organization. Storm, flood, or earthquake damage leading to loss of certain transportation routes in a city, for example bridges crossing a river, could make it impossible for people to evacuate, and for emergency services to operate; these routes would be deemed critical infrastructure. Similarly, an on-line booking system might be critical infrastructure for an airline.

Urban infrastructure

Urban or municipal infrastructure refers to hard infrastructure systems generally owned and operated by municipalities, such as streets, water distribution, and sewers. It may also include some of the facilities associated with soft infrastructure, such as parks, public pools and libraries.

Green infrastructure

Green infrastructure is a concept that highlights the importance of the natural environment in decisions about land use planning. In particular there is an emphasis on the "life support" functions provided by a network of natural ecosystems, with an emphasis on interconnectivity to support long-term sustainability. Examples include clean water and healthy soils, as well as the more anthropocentric functions such as recreation and providing shade and shelter in and around towns and cities. The concept can be extended to apply to the management of stormwater runoff at the local level through the use of natural systems, or engineered systems that mimic natural systems, to treat polluted runoff.

Marxism

In Marxism, the term infrastructure is sometimes used as a synonym for "base" in the dialectic synthetic pair *base and superstructure*. However the Marxist notion of base is broader than the non-Marxist use of the term infrastructure, and some soft infrastructure, such as laws, governance, regulations and standards, would be considered by Marxists to be part of the superstructure, not the base.

Natural monopoly

The systems tend to be natural monopolies, insofar that economies of scale means that multiple agencies providing a service are less efficient than would be the case if a single agency provided the service. This is because the assets have a high initial cost and a value that is difficult to determine. Once most of the system is built, the marginal cost of servicing additional clients or users tends to be relatively inexpensive, and may be negligible if there is no need to increase the peak capacity or the geographical extent of the network.

In public economics theory, infrastructure assets such as highways and railways tend to be public goods, in that they carry a high degree of non-excludability, where no household can be excluded from using it, and non-rivalry, where no household can reduce another from enjoying it. These properties lead to externality, free ridership, and spillover effects that distort perfect competition and market efficiency. Hence, government becomes the best actor to supply the public goods.

Ownership and financing

Infrastructure may be owned and managed by governments or by private companies, such as public utility or railway companies. Generally, most roads, major ports and airports, water

distribution systems and sewage networks are publicly owned, whereas most energy and telecommunications networks are privately owned. Publicly owned infrastructure may be paid for from taxes, tolls, or metered user fees, whereas private infrastructure is generally paid for by metered user fees. Major investment projects are generally financed by the issuance of long-term bonds.

An interesting comparison between privatization versus government-sponsored public works involves high speed rail (HSR) projects in East Asia. In 1998, the Taiwan government awarded the Taiwan High Speed Rail Corporation, a private organization, to construct the 345 km line from Taipei to Kaohsiung in a 35-year concession contract. Conversely, in 2004 the South Korean government charged the Korean High Speed Rail Construction Authority, a public entity, to construct its high speed rail line, 412 km from Seoul to Busan, in two phases. While different implementation strategies, Taiwan successfully delivered the HSR project in terms of project management (time, cost, and quality), whereas South Korea successfully delivered its HSR project in terms of product success (meeting owners' and users' needs, particularly in ridership). Additionally, South Korea successfully created a technology transfer of high speed rail technology from French engineers, essentially creating an industry of HSR manufacturing capable of exporting knowledge, equipment, and parts worldwide.^[26]

Henceforth, government owned and operated infrastructure may be developed and operated in the private sector or in public-private partnerships, in addition to in the public sector. In the United States, public spending on infrastructure has varied between 2.3% and 3.6% of GDP since 1950. Many financial institutions invest in infrastructure.

Most pension funds have long-dated liabilities, with matching long-term investments. These large institutional investors need to protect the long-term value of their investments from

inflationary debasement of currency and market fluctuations, and provide recurrent cash flows to pay for retiree benefits in the short-medium term: from that perspective, infrastructure is an ideal asset class that provides tangible advantages such as long duration (thus facilitating cash flow matching with long-term liabilities), protection against inflation and statistical diversification (low correlation with 'traditional' listed assets such as equity and fixed income investments), thus reducing overall portfolio volatility.

The 2009 report card produced by the American Society of Civil Engineers gave America's Infrastructure a grade of "D". So what grade would the American society of Civil Engineers give to Nigerian Infrastructure your guess is as good as mine!

Infrastructure and economic growth have always been in debate. In developing nations, expansions in electric grids, roadways, and railways show marked growth in economic development. However, the relationship does not remain in advanced nations who witness more and more lower rates of return on such infrastructure investments.

Nevertheless, infrastructure yields indirect benefits through the supply chain, land values, small business growth, consumer sales, and social benefits of community development and access to opportunity. The American Society of Civil Engineers cite the many transformative projects that have shaped the growth of the United States including the Transcontinental Railroad that connected major cities from the Atlantic to Pacific coast; the Panama Canal that revolutionized shipment in connected the two oceans in the Western hemisphere; the Interstate Highway System that spawned the mobility of the masses; and still others that include the Hoover Dam, Trans-Alaskan pipeline, and many bridges (the Golden Gate, Brooklyn, and Bay Bridge). All these efforts are testimony to the infrastructure and economic development correlation. In Nigeria, we seem to be infrastructure "shy".

Use as economic stimulus

During the Great Depression of the 1930s, many governments undertook public works projects in order to create jobs and stimulate the economy. The economist John Maynard Keynes provided a theoretical justification for this policy in *The General Theory of Employment, Interest and Money*, published in 1936. Following the global financial crisis of 2008–2009, some again proposed investing in infrastructure as a means of stimulating the economy (see the American Recovery and Reinvestment Act of 2009).

Environmental impacts

Environmental impact assessment

While infrastructure development may initially be damaging to the natural environment, justifying the need to assess environmental impacts, it may contribute in mitigating the "perfect storm" of environmental and energy sustainability, particularly in the role transportation plays in modern society. Offshore wind power in England and Denmark may cause issues to local ecosystems but are incubators to clean energy technology for the surrounding regions. Ethanol production may overuse available farmland in Brazil but have propelled the country to energy independence. High speed rail may cause noise and wide swathes of rights-of-way through countryside and urban communities but have helped China, Spain, France, Germany, Japan, and other nations deal with concurrent issues of economic competitiveness, climate change, energy use, and built environment sustainability.

As of today, the 29th December, 2011; the UK chancellor of the Exchange (Minister of Finance), will announce a £30 Billion (approximately \$49.5 Billion), investment in

INFRASTRUCTURE, including a brand New Airport in the Thames estuary, because, as he says “Britain has under invested in infrastructure”. This includes a £600 Million (\$990 Million) investment in new schools and technical colleges.

But not surprisingly, in a country with great accountability the chancellor is also giving what he calls “small business breaks”. In other words, easier bank loans and guarantees for United Kingdom SMEs, because they create more jobs than the larger multi-nationals, who in fact have been shedding jobs.

Why is the UK chancellor able to embark on this pronged strategy? It’s because of the existing **INFRASTRUCTURE** which he wants to both build on and improve, and also utilize to assist that country’s SMEs.

The first paved streets appear to have been built in Ur in 4000 BCE. Corduroy roads were built in Glastonbury, England in 3300 BCE and brick-paved roads were built in the Indus Valley Civilization on the Indian subcontinent from around the same time. In 500 BCE, Darius I the Great started an extensive road system in Persia (Iran), including the Royal Road.

With the rise of the Roman Empire, the Romans built roads using deep roadbeds of crushed stone as an underlying layer to ensure that they kept dry. On the more heavily travelled routes, there were additional layers that included six sided capstones, or pavers, that reduced the dust and reduced the drag from wheels.

In the medieval Islamic world, many roads were built throughout the Arab Empire. The most sophisticated roads were those of the Baghdad, Iraq, which were paved with tar in the 8th century.

Canals

Many notable sea canals were completed in this period, such as the Suez Canal in 1869, the Kiel Canal in 1897, and the Panama Canal in 1914.

In Europe, particularly Britain and Ireland, and then in the early US and the Canadian colonies, inland canals preceded the development of railroads during the earliest phase of the Industrial Revolution. In Britain between 1760 and 1820 over one hundred canals were built.

In the United States, navigable canals reached into isolated areas and brought them in touch with the world beyond. By 1825 the Erie Canal, 363 miles (584 km) long with 82 locks, opened up a connection from the populated northeast to the fertile Great Plains. During the 19th century, the length of canals grew from 100 miles (160 km) to over 4,000 miles (6,400 km), with a complex network in conjunction with Canada making the Great Lakes navigable, although some canals were later drained and used as railroad rights-of-way.

Railways

The earliest railways were used in mines or to bypass waterfalls, and were pulled by horses or by people. In 1811 John Blenkinsop designed the first successful and practical railway locomotive,¹ and a line was built connecting the Middleton Colliery to Leeds. The Liverpool and Manchester Railway, considered to be the world's first intercity line, opened in 1826. In the following years, railways spread throughout the United Kingdom and the world, and became the dominant means of land transport for nearly a century.

In the US, the 1826 Granite Railway in Massachusetts was the first commercial railroad to evolve through continuous operations into a common carrier. The Baltimore and Ohio, opened in

1830, was the first to evolve into a major system. In 1869, the symbolically important transcontinental railroad was completed in the US with the driving of a golden spike at Promontory, Utah.

Roads

Tar-bound macadam, or tarmac, was applied to macadam roads towards the end of the 19th century in cities such as Paris. In the early 20th century tarmac and concrete paving were extended into the countryside.

Telephone service

In 1876, Alexander Graham Bell achieved the first successful telephone transmission of clear speech. The first telephones had no network, but were in private use, wired together in pairs. Users who wanted to talk to different people had as many telephones as necessary for the purpose. A user who wished to speak, whistled into the transmitter until the other party heard. Soon, however, a bell was added for signaling, and then a switch-hook, and telephones took advantage of the exchange principle already employed in telegraph networks. Each telephone was wired to a local telephone exchange, and the exchanges were wired together with trunks. Networks were connected together in a hierarchical manner until they spanned cities, countries, continents, and oceans.

Electricity

At the Paris Exposition of 1878, electric arc lighting had been installed along the Avenue de l'Opera and the Place de l'Opera, using electric Yablochkov arc lamps, powered by Zénobe Gramme alternating current dynamos. (*Lagos Street lights*)

Yablochkov candles required high voltages, and it was not long before experimenters reported that the arc lights could be powered on a seven mile (11 km) circuit.^[46] Within a decade scores of cities would have lighting systems using a central power plant that provided electricity to multiple customers via electrical transmission lines. These systems were in direct competition with the dominant gaslight utilities of the period.

The first electricity system supplying incandescent lights was built by the Edison Illuminating Company in lower Manhattan, eventually serving one square mile with six "jumbo dynamos" housed at Pearl Street Station.

The first transmission of three-phase alternating current using high voltage took place in 1891 during the International Electro-Technical Exhibition in Frankfurt. A 25 kilovolt transmission line, approximately 175 km (109 mi) long, connected Lauffen on the Neckar with Frankfurt. Voltages used for electric power transmission increased throughout the 20th century. By 1914 fifty-five transmission systems operating at more than 70,000 V were in service, the highest voltage then being used was 150,000 V.

Water distribution and sewers

In the 19th century major treatment works were built in London in response to cholera threats. The *Metropolis Water Act (1852)* was enacted. "Under the Act, it became unlawful for any water company to extract water for domestic use from the tidal reaches of the Thames after 31 August 1855, and from 31 December 1855 all such water was required to be effectively filtered. The *Metropolitan Commission of Sewers* was formed, water filtration was made compulsory, and new water intakes on the Thames were established above Teddington Lock.

The technique of purification of drinking water by use of compressed liquefied chlorine gas was developed in 1910 by US Army Major Carl Rogers Darnall, Professor of Chemistry at the Army Medical School. Darnall's work became the basis for present day systems of municipal water purification. Which shows you the power of R and D.

Subways

In 1863 the London Underground was created. In 1890, it first started using electric traction and deep-level tunnels. Soon afterwards, Budapest and many other cities started using subway systems. By 1940, nineteen subway systems were in use.

Only in the context of international debate about economic development after the Second World War did the term infrastructure become a label for the technical-political systems required for growth and modernity. What if we took the very idea of an infrastructure as a historical problem, and asked not how the infrastructures of the past were organized, but how things like roads, telecommunications, and power came to be seen as similar kinds of things, parts of the coherent bundle we now call infrastructure? As part of a reflection on the internationalization of infrastructures,

Public Utilities

Public Utilities are a question of price: a way of justifying price regulation to ensure that socially sensitive services are not interrupted by cyclical economic fluctuations. Natural monopolies, in turn, are a function of the supply–demand curve (Robinson 1928; Porter 1995; Mosca 2006). In contrast, the category of infrastructure has its roots in a debate about cost, where the business logic of overhead accounting came to be applied to entire national economies. The question of cost is also what separates the modern concept of infrastructure from earlier uses of the word.

The word infrastructure, as others have pointed out, can be traced back to French railroad engineering in the late nineteenth century, and infrastructure was an important category in French, in a variety of domains, long before it began to be used in other languages after 1950 (Laak 1999).² But nowhere in these earlier uses of infrastructure can one find the idea that large-scale engineering systems, especially those of transportation and communication, together constitute a supportive base for other kinds of economic activity.

SMALL SCALE AND MEDIUM SCALE ENTERPRISES (SMEs)

The Small Scale and Medium Sized Enterprises (SMEs) have been credited with enormous contribution to the growth of the developed economies of the world. In the same vein, the Information and Communications Technologies (ICT), and particularly the Internet have played their own part in those economies. The SMEs provide the cornerstones on which any country's economic growth and stability rests. The American economy, the largest economy in the world, depends largely on the success of SMEs for "innovation, productivity, job growth and stability" (SBA Report, 2000). Small businesses represent more than 99% of all employers, employ 51% of private-sector workers, employ 38% of workers in high-tech occupations, provide about 75% of new jobs of the private sector output and represent 96% of all goods exporters" (Twist, 2000).

Of equal strategic importance is also the role of the SMEs in other developing countries like Nigeria. With a Gross National Product (GNP) of some \$41.2 billion plus and a World Bank estimated population of 126.9 million, Nigeria is one of the largest economies in Africa (World Bank Report, 2000). This being the case, the economic success or failure of Nigeria can affect not only the country but the whole of sub Sahara Africa. This is why any effort geared towards

understanding how the SMEs make use of emerging technologies in improving their products and services which ultimately reflect on their growth potential is worthwhile.

A study conducted in Nigeria by the Federal Office of Statistics shows that over 97% of all businesses in Nigeria employ less than 100 employees. This therefore means that about 97% of all businesses in Nigeria are SMEs (Ariyo, 2000). The Federal Government of Nigeria initiated and actualized some policy measures, like the setting up of Small and Medium Industries Equity Investment Scheme (SMIEIS), in the expectation that improved funding would facilitate the achievement of higher economic growth.

Economic Growth, SMEs and Information and Communication Technologies.

The United Nations (UN) under its Millennium Development Goal (MDG) set a target of halving the number of people living in extreme poverty by the year 2015. In his Foreword in the UNCTAD (2002) report, the then UN Secretary General, Kofi Anan warned that for the world to achieve the Millennium Development Goal in 2015, Information and Communication Technologies (ICTs) must figure prominently in the effort. This is where the developing countries, continually “leapfrog”

Also in Nigeria, the introduction of mobile telephony has encouraged a new generation of ‘netpreneurs’ who use their mobile phones to make money. It is now a common sight in most cities in the country to find road-side ‘call centres’ operating under umbrellas, under trees and road-side shacks. Most of the customers to these ‘business centres’ actually own their own mobile phones. However, they patronize the centers simply because it is cheaper to make calls from the centers than doing so with their own phones. The ‘call centre’ operators on the other

hand make their money by cutting down the cost of making calls by using 'booster' call cards and through the discounts they get from the network operators through bulk purchasing. The more phone cards one buys in Nigeria within a time period, the less one pays per unit card.

Small and medium-sized enterprises (SMEs) are a very heterogeneous group of businesses usually operating in the service, trade, agri-business, and manufacturing sectors. They include a wide variety of firms such as village handicraft makers, small machine shops, and computer software firms that possess a wide range of sophistication and skills. Some are dynamic, innovative, and growth-oriented while others are satisfied to remain small and perhaps family owned. SMEs usually operate in the formal sector of the economy and employ mainly wage-earning workers. SMEs are often classified by the number of employees and/or by the value of their assets. The size classification varies within regions and across countries relative to the size of the economy and its endowments. It is important to note that there is a minimum as well as a maximum size for SMEs.

Take a look at any big company. Now, look back through time and track down when the company actually began. Not too many were born the size of the National Federal Bank or Procter & Gamble. Almost every company we know of began as an SME. The all-powerful Microsoft began as a couple of young men in a small garage in North-America; Vodafone as we know it today was once a little spin-off from Racal; Hewlett-Packard started in a little wood shack; Google was started by a couple of young men who thought they had a good idea; even Volkswagen at one point was just a little car maker in Germany (as opposed to being a giant small car maker globally). Ditto with facebook. Everybody or almost everybody now knows the skype.

The whole issue of SMEs is one of scale. A company of 20 people is viewed as an SME to a company of 500; and a company of 500 might be viewed as an SME to one of 5,000; and as well, you get the picture. But at some point in time, most companies were small and medium enterprises. Companies usually start because someone has what they think is a good idea. They take that good idea, and with commitment to it, go out and find customers who want it, and they are in business. Starting a business is bloody hard work, and when (and if) you get through the first year or two; you begin to run up against bigger businesses.

SMEs provide products and services that the big competitors don't for one reason or another. Take for example the large motor manufacturers. Perhaps it is because the market place is too small. SMEs deliver what no one else seems to want to deliver, and in many cases, they do it very well. Then why is it that many large companies treat SMEs like indentured servants that can be pushed around with (sometimes) unreasonable demands? The only reasons we can think of are firstly; a sense of power, and/or secondly; they forget that without SMEs out there, many big companies would not be able to deliver what they promise to customers.

Having the 'power' over smaller companies can be a nice thing. You get to decide what you want, when you want it, how you want it, and what you will pay for it. All fine. But when you press SMEs too far, you run the risk of driving them into the ground, and without them, you might find yourself in a fine mess. If a big company has a reputation of beating SMEs into submission, word can get around, and what used to be a fertile ground of SMEs to choose from may become a deserted wasteland.

The **Companies Act in the UK** of 1985 states that a company is 'small' if it satisfies at least two of the following criteria: (Small Business Service, UK)

- a turnover of not more than £5.6 million;

- a balance sheet total of not more than £2.8 million;
- not more than 50 employees

A medium sized company must satisfy at least two of the following criteria:

- a turnover of not more than £22.8 million;
- a balance sheet total of not more than £11.4 million;
- not more than 250 employees

For statistical purposes, the Department of Trade and Industry in the UK and governments all-around EU usually use the following definitions:

- micro firm: 0 - 9 employees
- small firm: 0 - 49 employees (includes micro)
- medium firm: 50 - 249 employees
- large firm: over 250 employees

- ***The average European enterprise employs 6 people***
- On average, an enterprise in Europe - even including all very large enterprises- provides employment to 6 people; the average for SMEs only is 4 people. However, this varies between 2 people in micro enterprises, and over 1 000 in large enterprises. Between countries, there are large differences as well. On average, an enterprise has 2 occupied persons in Greece and in Hungary too; and 3 in Italy, compared with 10 in Ireland, Luxembourg, Austria and the Netherlands.
- It is instructive to note that such international label from Italy, such as Prada mosculinogreg morescliu, started off as SMEs and in fact some are still functioning as SMEs and another example of SMEs.
- ***Most jobs in Europe are created by micro enterprises***

- On balance, large enterprises have been losing over the last decade jobs between, while employment in the SME-sector has increased. In the early years this growth was concentrated in micro and small enterprises, as significant employment growth in medium-sized and large enterprises only started in 1997. In 2001, employment growth slowed down, because of world economy shrank. Current estimates show that this occurred both in SMEs and large enterprises, but the slowdown is slightly more pronounced in large enterprises.
- Infact, right now, SMEs have once again become the focus of of attention for job growth in the western Economics. There are approximately, 19.3 million enterprises in the European Union (EU) today, up to 99.8% are defined as SMEs and employ about 75 million people. There are only 35,000 enterprises, with more than 250 employees, but 18 million enterprises employ fewer than 10 people - the micro-enterprises. The average European business provides employment for 4 people, including the owner/manager, the average turnover being 500,000 euro. (6th Annual Report of the European Small Business Observatory)
- However, on a global scale, SMEs provide some 66% of jobs in the European Union (EU) - a percentage which is predicted to rise as SMEs face challenges and opportunities associated with increased globalisation, largely through e-commerce and greater Internet usage by entrepreneurs. In the last decade, SMEs were the principle creators of new jobs, whilst on average; big industry has downsized and reduced employment. EU SMEs currently generate 56.2% of the private sector turnover in all the EU economies!

COMPARISON WITH OTHER DEVELOPING COUNTRIES: INDIA AND OTHERS

The American Heritage Dictionary, defines the term “infrastructure” as “The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.” However, the areas of infrastructure have broadened over the years and cover Agriculture, Food, Water, Public Health, Emergency Services, Government, Defense Industrial Base, Information and Telecommunications, Energy, Transportation, Banking and Finance, Chemical Industry, Postal and Shipping and many other sectors. Infrastructure has been a subject that has traditionally been in the hands of the government. Right from the year 1947, till around 1994, there have been some debates about which part of the infrastructure sector needed to be in the private sector, and which part in the public sector. Compared to countries of the Far East such as Malaysia, Thailand and China, India has struggled in getting these regulations together.

The Rest of the world

- **Asia:** 'It has been recognised that some of the world’s best performing economies, notably Taiwan and Hong Kong, are very heavily based on small enterprises'. 81% of all employment in Japan is in SMEs where the average enterprise employs nine staff as opposed to four in the EU. China is undoubtedly the “big dragon” and the Chinese government actively encourage cheap loan to all SMEs.
- **Latin-America:** After focusing on large investments and wooing multinationals for years, Latin American politicians are beginning to realize that SMEs are the true job creators, as well as important players in technology supply chains. The vast majority

(approximately 80-90%) of companies are micro enterprises and the governments have vastly reduced red tape to ensure SMEs needs are attended to swiftly. Among the major regional economies, only Argentina experienced a drop in the number of SMEs between 1998 and 2002, while these types of businesses flourished elsewhere in Latin-America, especially in Brazil and Mexico. While in Brazil the economy expanded by only 0.8% in 1999, SMEs grew by 6.5%. In Colombia, SMEs now account for 36% of all jobs and 63% of industrial jobs. Moreover, SME membership in Colombia's chambers of commerce rose from an average of 20% in 2000 to 93% in 2002.

- The Current UK chancellor of the Exchange (Minister of Finance) is taking urgent steps to stimulate SMEs with taking breaks etc because everybody has realized their importance.
- **South Africa:** 'South Africa: being the most industrialized country on the continent of Africa, the share of employment located in the micro, small and medium sectors taken together is high – estimated recently at 60% while the sector generated about 40% of output'. (Government of South Africa Report) South Africa has little problem with infrastructure, as it produces a whopping 44,000 to 50,000 megawatts of electricity. In Nigeria, we are still struggling to produce a mere 4,000 megawatts.
- ***The Developing World***
- The International Finance Corporation states. In much of the developing world the private economy is almost entirely comprised of SMEs' and that 'they are the only realistic employment opportunity for millions of poor people throughout the world'.
- Some experts explain that 'a significant section of SMEs in developing countries remains in traditional activities generally with low levels of productivity, poor quality products, serving small, localized markets. There is little or no technological dynamism in this

group, and few 'graduate' into large size or modern technologies. In many poor countries, there is also a large underclass of (formal and informal) micro enterprises that ekes out a bare survival'.

- ***What do SMEs need for success?***

The globalisation of business has increasingly drawn SMEs into global value chains through different types of cross-border activities. Many entrepreneurs are recognizing the opportunities that this process offers and gaining access to global markets has become a strategic instrument for their further development. Access to global markets for small businesses can offer a host of business opportunities, such as larger and new niche markets; possibilities to exploit scale and technological advantages; upgrading of technological capability; ways of spreading risk; lowering and sharing costs, including R&D costs; and in many cases, improving access to finance. Gaining access to global markets can help prospective high-growth firms realize their potential and is often an essential strategic move for SMEs with large investments in intellectual property.

- To prosper, SMEs need a conducive business environment and regulations, adequate basic infrastructure services, access to short and long-term funding at reasonable rates, equity and venture capital, advisory assistance, and knowledge about market opportunities. They typically suffer from weak entrepreneurial skills as well as deficiencies in accounting, production management, and business planning. As SMEs grow, they increasingly need connectivity to export markets and the world economy. So far, the lessons of international experience show that very few government and donor initiatives have succeeded in implementing sustainable strategies for SME development. To succeed, sustainable SME development will require concerted efforts among the various parties concerned including commercial and rural banks, leasing companies and

equity providers, consulting and training firms, internet providers, as well as local business associations.

Governments' role in the process should be limited to providing the enabling environment for private sector development, correcting potential market failures and creating a level-playing field that will allow SMEs to compete with their larger counterparts on an equal basis. Governments do not have the finances or the ability to get involved directly in economic activities such as SME financing and service provision. Emerging international experience is demonstrating that government is not the appropriate vehicle to implement and coordinate such efforts, and that public-private partnerships for SME development are a critical element for the success of these efforts.

While seemingly successful for purposes of direct poverty alleviation, microcredit programmes are insufficient for the kind of SMEs which are the focus of this speech, namely enterprises which seek to expand and sell to distant markets. The latter are caught in a now well-documented dilemma: public development banks have the required developmental orientation but lack outreach while commercial banks have the outreach but lack the developmental policy. Ways of breaking out of this dilemma through credit guarantees and other devices were identified above.

Access to finance remains a major problem in the majority of African countries. Development banks seem to have performed particularly poorly and, in West and Central Africa, they have all collapsed. While loans from commercial banks are at least possible in principle, later examples show that the terms of such access are often punitive for SMEs. Overall it seems that the problems remain severe in Cote d'Ivoire, Cameroon, Ethiopia, Gabon, Kenya, Namibia, Nigeria, Senegal and Uganda. In some other countries, namely Mauritius and South Africa, SMEs appear

to have better access to finance, but in general terms, none of the African countries seem to have an efficient structure of financial institutions providing short- and long term capital to SMEs. In this context, alternative means of financing have been developed, especially in those countries where formal lending is weak. Thus, microcredit schemes have been promoted by NGOs in many African countries. Access to these schemes is relatively high in Kenya and Uganda.

Some examples in other part of Africa

• *Shortage and inadequacy of financial institutions for SME support.* This is a major obstacle for SME development. For instance, the Senegalese private sector remains handicapped by the fact that most financial institutions are ill equipped to serve the SME sector. Such institutions appear to have serious internal management weaknesses and unqualified staff, which explain the poor quality of the services provided.

In some countries such as Cameroon and Gabon, the mission noticed that the human resources of the financial institutions are inadequate both in number and quality. Most staff lack experience and motivation. As these institutions are short of internal resources, they cannot recruit skilled manpower, train staff and pay reasonable salaries. In Uganda, the poor performance of banks seems to be due to huge nonperforming loans, and lack of efficient management. Several banks have been closed down by the Central Bank due to insolvency.

• *High interest rates, high collateral requirements, and restriction of collateral to specific assets.*

Commercial banks often discriminate against SMEs because they are considered high risk. Clients with little or no resources to provide collateral. For instance, in Gabon and Cameroon, real interest rates on loans can go up to 25 per cent, and although development banks exist, they

operate like commercial banks with the same loan conditions. In Uganda, interest rates range between 22 and 27 per cent. In Senegal, business owners complain about the inflexibility of banks in enforcing onerous collateral requirements for any credit they extend.

In some other countries such Nigeria, SMEs, access to working capital in the form of short-term loans and overdraft facilities is highly limited. Banks and other financial institutions have no confidence in SMEs as they are perceived as high-risk ventures with high rate of failure. They establish prohibitive collateral conditions that most SMEs cannot afford.

Lack of an effective co-ordination mechanism to centralise information on possible sources of finance.

In most cases, there is no umbrella institution providing information on financial sources. Each individual institution generally advertises only the services it provides. This is widely acknowledged in Kenya, where the lack of an information centre and appropriate channels constitutes a major handicap for the collection of relevant information for SME development. In Namibia, there are many government agencies, banks and NGOs involved in supporting SMEs, but the country lacks an effective co-ordination mechanism to centralise SME-related information.

Misuse of government sources. Financial assistance from government sources can be misused to target certain sectors of society that are not supposed to benefit from such schemes. In Nigeria, it seems that financial support from government sources is usually directed to political loyalists of the government. These loans are often given as rewards for political support.

Concentration of finance sources in urban areas.

Due to vast distances between major cities and rural settlements, the delivery cost of credit schemes tends to be exorbitant, making them very expensive to implement. This is certainly the case in Namibia where it has been observed that the vast majority of financial support schemes are concentrated in the capital. Bearing in mind all these limitations to SME finance in Africa, one wonders whether micro-finance institutions have been an alternative to commercial and development banks funding schemes. Countries such as Kenya and Uganda appear to have a good network of NGOs providing short-term funding for SMEs. The mission reports point out that the main pitfall of these schemes is the limited size of the loans, which does not seem to have a big impact on SMEs technological capability building and competitiveness. Nevertheless, NGO micro-finance programmes are increasingly being used at least for short-term needs that are rarely served by commercial and development banks.

An initiative similar to that planned in Mauritius was implemented by the government of South Africa. *Khula Enterprise Finance Ltd* was established as the main financial support service to SMEs. Its mission is to ensure improved availability of working capital for SMEs by offering loans, guarantees and seed funds to provide initial capital through intermediaries (banks). However, it should be acknowledged here that although the initiative is highly innovative, some of the banks involved have not lent in the range most needed.

Access to finance remains a major problem for SMEs. Most entrepreneurs have to rely entirely on their own savings and money borrowed from friends and relatives. In some African countries, financial institutions are completely absent. In others they are often inefficiently run by unmotivated and unqualified staff. The conditions for SME lending are usually difficult to meet, especially the collateral requirements. Micro-finance schemes launched by NGOs and aid

agencies have presented an alternative source of finance. These programmes have been growing in recent years, but the small size of the loans remains insufficient for SMEs technological capability building and competitiveness. Some African countries, namely South Africa and Mauritius, are investing heavily in establishing friendlier financial policies for the benefit of SMEs. The move towards introducing mutual credit guarantees and equity participation will help companies address the collateral requirement problem and secure capital.

In some African countries there does not seem to be an institutional network providing technology-related support services to SMEs. This appears to be the case in Cameroon, Gabon, Morocco and Namibia. In others, such as Ethiopia, Nigeria and Uganda, these institutions exist, but their usefulness is considered to be low. Only a few countries, namely South Africa and Mauritius, have a technology-related support system which contributes effectively to the technological capabilities of SMEs.

In some countries support services for technology and skills development are quasi absent. Although the governments of Cameroon, Gabon, Morocco and Namibia acknowledge that the introduction of appropriate technology is crucial for the development of the manufacturing sector, they have no centres to assist SMEs in technology acquisition and transfer, as well as product and process development. In these countries, enterprises' access to machinery and equipment is particularly difficult, operatives are not taught operational and safety procedures, there are no technical training institutions, nor standards for locally produced goods. For instance, a recent survey in Namibia notes that in the absence of a standards institute, Namibian companies have to depend on the South Africa Bureau of Standards to obtain their quality certifications. In Morocco, the Centre for the Promotion of Enterprises does not supply

technology-related services and only focuses on improving the management and export-marketing expertise of SMEs. Similarly, SME support institutions in Gabon and Cameroon do not provide technology and skills development services to SMEs.

Lack of manpower with appropriate technical skills, low productivity of labour, and lack of technological information remain the most critical technical problems facing SMEs.

In Nigeria, in spite of multiple efforts by the government and some multilateral agencies in the area of support services for technology and skills development for SMEs, the mission report underlined the weakness of achievements recorded. These efforts were either misdirected, badly implemented or poorly funded. For instance, the Working-For-Yourself Programme (WFY) has proved to be a useful start-up programme but is very weak on the follow-up and survival side.

Some support service schemes in Africa have had a positive impact on company's technological capabilities. This appears to be the case in Kenya where there are a good number of government agencies and NGOs providing services for technology and skills development. These include MCTS, Kenya Industrial Research Development Institute, KIPO, Approtec and Kenya Industrial Estates Limited. As far as technology acquisition and transfer is concerned, entrepreneurs affirm that the technical services provided have helped them to foster their internal capabilities and therefore their competitiveness. However, the impact of these services on companies' innovation and production capabilities and skills formation is rather limited. In general, information gathering and dissemination is not well developed in the country, and there are no formal mechanisms for the exchange of experiences and best practices in the area of technology.

In the Nigerian context, there is specifically in relation to SME I doff, my hat to anybody who ventures into SMEs. Everybody sitting in this hall which in itself is part of private municipal infrastructure.

Everybody involved in developmental economics knows that heavy investment in infrastructure prepares a community or country not only for the future but also creates employment. Otherwise, why would Barack Obama today be scratching his head while looking for money for infrastructure.

CONCLUSION.

Distinguished guests, ladies and gentlemen, members of the EDC Alumni Club, from the talk we've just had, I sincerely hope that we've all learned more about infrastructure and the challenge it poses to SME's. We are all victims of the appalling lack of both hard and soft infrastructure in Nigeria to the extent that we all end up being our own local governments!

Take for example the National Museum in Onikan, Lagos Island. The new building was converted to a shopping mall of all things! Go to the great cities of the World, and you'll see museums all over the place, where parents take their children for a learning experience, time and time again! I benefitted from this, having been privilege to have gone to England at the tender age of seven and a half. Libraries, zoo, etc.

But it's up to all of us in this auditorium, to make things better and not rely on Government alone at any level to give us everything, we must insist on accountability, because that's what makes societies great!

We have only one country to call home, and we have to make it worth living in and not allow ourselves to be deprived access to both hard and soft infrastructure, because as the late Malcolm X said, and I quote,

"The future belongs to those Who prepare for it today"

Thank you Distinguished ladies and gentlemen for inviting me tonight.

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