2

Logistics and Supply Chain Infrastructure Development in Africa

Adebisi Adewole

2.1 Introduction

The impact of global logistics and supply chain strategy has generated intense debate in both the academic sector and industry. But the significance of trade logistics infrastructure as a prerequisite for easier and better movement of goods and services in twenty-first-century Africa has attracted little attention. Business analysts and researchers (Fosu 2018; Brigsten 2018; Thorbecke and Ougang 2018) on Africa agree that Africa's economies are growing as the continent emerges as a strategic trading bloc with a growing wealth and urban-centric population. There are, however, growing concerns that poor logistical freight infrastructure, such as road and rail networks, air and seaports, as well as inadequate modern technologies pose difficult challenges to trade within Africa and between Africa and the rest of world.

A. Adewole (✉)
School of Business and Enterprise, University of the West of Scotland, Paisley, UK
e-mail: adebisi.adewole@uws.ac.uk

A. Adewole, J. J. Struthers (eds.), *Logistics and Global Value Chains in Africa*, Palgrave Studies of Sustainable Business in Africa,
https://doi.org/10.1007/978-3-319-77652-1_2

Suitable logistics infrastructure is a critical element of the fundamentals that make trading with Africa a priority for multi-nationals. A World Bank report (World Investment Report 2013) indicated that between 2006 and 2009, annual private capital inflows to Africa rose from around USD 30 billion to more than USD 80 billion. However, according to the report, the challenge remains that an increase in both intra-African and inter-continental trade with Africa has not translated into improved economies. Most African countries anchored their developmental economy on primary product exports, which, in the view of global value chain experts, are subject to price volatility arising from unfavourable terms of trade. The Human Right Development Report (2009) asserted that while many countries of the world have recorded steady improvements with regard to human development, many African countries suffered human development reversals from which they are yet to recover. This predicament is likely to be instrumental in the slow economic growth experienced in many African countries.

Chuhan Pole (2017) nevertheless reported Africa to have recorded some signs of impressive economic performances as the real per capita gross domestic product (GDP) continues to grow. His report stated that the continent is showing signs of recovery, and regional growth is projected to reach 2.6% in 2017, with growth expected to rise only slightly above population growth, a pace that hampers efforts to boost employment and reduce poverty. His report further noted that although recovery has been slow due to insufficient adjustment to low commodity prices and policy uncertainty in Africa, Nigeria, South Africa and Angola, the continent's largest economies have seen a rebound from the sharp slowdown in 2016.

The International Monetary Fund (IMF 2013) reported that growth in emerging markets including Africa will expand at an average of 6% a year from 2013 to 2018, far outpacing projections for the USA, Europe and that of emerging Asia for the first time. Similarly, an IMF report forecast that in the next decade, Africa's growth will continue to rival that of Asia, outpacing other emerging regions such as Latin America, the Middle East and Eastern Europe. The report further stated that African economies in the next decade will expand more than twice as fast as those of the developed world and are therefore likely to offer the highest returns and best opportunities for investors, businesses and logistics services providers.

In 2013, the World Bank estimated that 49% of the continent's 250 million households had discretionary income and by the end of 2015 that figure rose to rise to 64% of 303 million households. This represents an increase of 86 million consuming households (McKinsey 2015) showing that Africa is fast becoming wealthier. With Africa's growing population and increasing wealth, as well as the significant size of its consuming middle class, it would mean that trade logistics will have a compelling role to play in Africa.

Chuhan Pole (2017) viewed that in this context, promoting public and private investment, notably in infrastructure, is a priority, as Africa experienced a slowdown in investment growth from nearly 8% in 2014 to 0.6% in 2015.

> With poverty rates still high, regaining the growth momentum is imperative. Growth needs to be more inclusive and will involve tackling the slowdown in investment and the high trade logistics that stand in the way of competitiveness. Chuhan Pole (2017)

He noted that the urgent implementation of reforms to improve institutions that foster private sector growth, develop local capital markets, improve infrastructure and strengthen domestic resource mobilisation are imperatives for economic growth and development in Africa.

Albert G. Zeufack, World Bank chief economist for the Africa Region further emphasised that as countries move towards fiscal adjustment, Africa needs to implement more reforms and establish the right conditions for investment so that the continent can achieve a more robust development and create a stable macroeconomic environment.

Africa is comprised of more than half of the fastest growing economies of the world with a growth rate of 6% in East and West Africa despite the not too impressive level of infrastructure in those regions. With 54 countries, each with its own unique opportunities and challenges, the continent has the potential to move fast. Africa has become a prime investment destination for many international companies, as well as for companies that are already trading within it to branch out to other countries in the continent. Of particular interest are those companies operating in the retail and energy industries.

Global logistics and supply chain activities are major facilitators of trade around the world, and the emergence of information and communication technologies and their influence on inter-continental trading has converged world trade to a village enterprise. Products and services that used to be far flung are now more readily available around the world. Logistics and logistical infrastructure have therefore become imperative for traders as macro-business environments become more competitive.

This chapter discusses the current state of logistics infrastructure in Africa and examines the need for a better, more dynamic logistics and supply chain infrastructure strategy for the continent.

2.2 Logistics and Supply Chain Management

The concept of logistics varies widely. It can, however, be succinctly described as a means of having the right thing of the right quality and quantity at the right place, at the right time. The key elements involve procurement and warehousing, maintenance and the distribution and movement of goods and services from point of origin to point of consumption. A logistics design process needs to take account of the requirements of inbound, outbound, internal and external movements as well as the return of materials for recycling and environmental purposes.

Supply chain activities are usually organised as flow-through processes across a network of organisations. It is the overall unified integrated management function that provides the co-ordination of all logistical activities, including the funding and functioning controls that help to ensure the entire supply pipeline meets performance requirements at a reasonable cost. Adewole (2003) defined supply chain network as "a group of inter-dependent companies collaborating together within a network of relationships to manage the movement of materials, part-finished and finished goods as well as services, including all transactions and shared information, along a customer-focused value system in order to realise superior benefits at a competitive cost". The main goal is to provide the support that ensures that all processes and activities, including logistics, information and financial flows are performed as designed and with maximum effectiveness (Fig. 2.1).

Fig. 2.1 A simplified linear logistics and supply chain structure from the source to the end consumer

2.3 Critical Issues in Logistics and of Supply Chains in Africa

Generally, logistics infrastructure appears to be poor in Africa particularly for freight transport such as road and rail, with only seaports improving in countries such as Nigeria, Ghana, Tanzania and Kenya. With the many critical challenges facing logistics infrastructure in Africa, it is crucial therefore that this sector should be given more attention as a component of Africa's trade and economic discourse. The ubiquitous infrastructure gap inhibiting intra-African and intercontinental trade with the rest of the world can be bridged if adequate attention is given to this sector. Africa currently presents unique but diverse challenges for logistics and supply chain operations. There are significant obstacles to logistical activities when trying to do business in Africa's markets. Primary among these are: inadequate rail capacity; poor inland road quality; political conflicts; insecurity of life and property; insufficient and ineffective regional collaborations; a high level of bureaucracy and poor decision-making processes; inadequate technology; corruption and crime; and, more important, cultural issues.

Other significant barriers identified by Schwab (2009) in the 2009 World Economic Forum (WEF) report have been associated with Africa's weak management processes, including bureaucratic customs agencies, poor port and transport arrangements and high transport costs, emanating from the continent's slow development speed in trade and transport technology. These organic inhibiting factors have constituted trade restrictions in many ways to both importers and exporters to and from Africa.

The WEF report also noted that a low ratio of roads per square kilometre with a scattered population and long distances between urban areas, as well as the landlocked nature of many African countries create natural

obstacles to competitiveness. The WEF crucially pointed out that inland transport costs are higher within Africa compared to other regions. African landlocked countries pay close to one-third more in inland transport costs than landlocked countries outside Africa. The report went further, estimating the average cost of importing a typical container of goods into Africa to be USD 1100, while exporting a similar container from Africa only costs USD 872. This is higher than all other regions except for Eastern Europe and Central Asia. In addition, the report stated that Africa has the highest average port costs and terminal handling fees for imports and exports.

Another major factor militating against Africa's logistics and transport systems is the high level of unpredictability in delivery times, thereby forcing companies to hold higher volumes of inventory than elsewhere in the world. It has been estimated that Africa is losing some USD 850 million a year in additional interest paid solely to buy inventories in advance. This estimated loss was 40% higher for African firms than for businesses in East Asia.

Inefficient customs operations at ports and land boarders in Africa can also cause difficulties. It takes an average of 35–40 days to complete complicated boarder crossing procedures and paperwork (one-third longer than in East Asia), resulting in drivers having to queue for days while the process of getting products across takes place. The length of time it takes to clear customs poses difficulties to what otherwise should be a seamless activity. WEF concluded that inland transport costs and weakness in transport and logistics sectors in Africa are major factors that have held back Africa's trade and economic development.

Matsaert (2015) says that transport and freight costs in East Africa are among the highest in the world, with freight logistics expenditure more than 50% higher per kilometre than in Europe or the USA. This extra cost is caused by a "logistics gap" resulting from poor or lack of infrastructure, inadequate warehousing facilities, poor road and rail transport and a low level of investment in technology. This gap is even more pronounced in landlocked countries such as Rwanda, Burundi, Mali, Burkina Faso, Botswana, Zimbabwe and the Democratic Republic of Congo, where transport costs can be as high as 75% of the value of exports.

Box 2.1

Frank Matsaert, a company chief executive, noted that in East Africa transit times are high from Mombasa (Kenya) to Kigali (Rwanda)—on average of two and a half weeks for a journey of 1600 kilometres. Freight trucks stop at two border posts and encounter 45 road blocks, each of which involves delays and costs, as well as potentially damaging the goods in transit. In contrast, a truck covering a similar distance in Europe—driving from Rotterdam (the Netherlands) to Budapest (Hungary)—would be able to complete the route in less than a day. Transport expenses are passed on to small businesses and customers. The World Bank estimated that logistics costs account for 40% of consumer prices in East Africa with a population of about 250 million people. A large number of small business owners are therefore unable to grow their businesses due to high logistical, sourcing and distribution costs.

Although the World Bank and African Development Bank (ADB) are reported to invest USD 93 billion and USD 50 billion respectively every year in order to bridge the infrastructure gap, the real problem is implementation. The economic imperative appears to be growing at a faster pace than the required political reforms, but what is necessary is a balance between the two for the required effective partnership between economic entities and political imperatives. The business environment has to be conducive to enabling investment to get the product to market. Investment in trade can be futile without an adequate supply chain infrastructure system in place. Intra-African trading activities can flourish successfully only with adequate transport logistics infrastructure.

Box 2.2

2.2.1 When African children drink Milo Chocolate drink or Bunvita, they are not aware that they are imported and that 45% of the cost covers transport and logistical resources. The product may have been made in Africa or overseas, whichever is applicable the children (or their parents) are paying part of the freight clearance charges, handling charges, insurance, fuel costs and wages of the freight driver who moved the product from point A to point B. Consumer goods cannot improve people's lives if the cost of importing them is too expensive for people to access.

2.2.2 Three little boys in Kigali are sharing a lollipop. They lick it in turns. The lollipop is imported, therefore 45% of its cost is due to transport and allied costs. It might have been made in Kenya or Tanzania or even further afield, and it might have travelled thousands of kilometres and passed through several borders. Whichever of the boys bought that treat has paid part of the freight clearance charges, handling charges, insurance, fuel costs and the salary of the trucker who brought it to the Rwandan capital.

The cases in Boxes 2.1 and 2.2 illustrate the significance of the activities in the supply and demand pipelines and how, to a great extent, they contribute value to the end customer. Therefore logistics and supply chain processes are essential as they create and deliver value to the market. Logistics is the element that determines the quickness (lead time), reliability and sometimes the size and location of inventories and facilities.

Despite the challenges facing trade logistics in Africa, the low cost of labour in Africa has driven renewed efforts from continental and inter-continental traders to exploit Africa's potential as a trading base, thereby raising the role of logistics and transport in the region (Box 2.3).

Box 2.3

DHL, the international parcel company, has more than 3300 service points across Africa. The network was developed by forming partnerships with small businesses, fuel retailers and supermarkets. DHL has grown a successful business in Africa by adapting to the local circumstances of informal economy, rural population and a large number of small businesses.

For many companies, however, the prospect of entering the African market poses too many challenges due to the inadequate logistics and supply chain resources that do not get beyond an individual country's national boundaries. What should be imperative to a willing trader is to

identify the linkages between national logistics realities and the continent-wide logistics requirements.

2.4 Electronic Technology in Logistics and Supply Chain in Africa

Within an organisation's product and service offering, technology plays a crucial role in the value chain. Well co-ordinated and integrated logistics, assisted by the application of information and communication technology, will bring the basic advantage of more efficient, cost-effective supply chain operations. This simply means that technology will help to unify the purpose of an organisation and its supply chain partners and help them to avoid duplication of effort, reduce waste of resources and enable better information sharing. In addition, the appropriate application of electronic technology will increase the speed of movement through the demand and supply pipeline, make planning easier, reduce uncertainty and variability, and eliminate barriers that may result in high levels of inventory holding among production, the warehouse and the retail outlets. Advanced digital technologies will help business models in Africa. Technology will drive a dramatic shift in how trade is conducted. Businesses in the global arena are witnessing increased market volatility in an intense competitive environment, thereby forcing new pressures and new approaches to doing business. Therefore, in order to deliver economic and outcomes, Africa will need to navigate the current shift and reinvent their logistics operations landscape to help to transform trade and economic development throughout the continent. International entrepreneurs doing business in and with Africa would need to collaborate with African national and regional governments to blend freight logistics and supply chain strategies with new technologies in order to deliver trade benefits to Africa. By establishing partnership engagements between business investors and African governments, the burden of trading and the cost of investment in new logistics capabilities will be shared, thereby propelling greater market successes.

2.5 Logistics Infrastructure in Trade and Development

Infrastructure in this chapter is defined as the basic physical transport systems for the business of trading that are vital to a country's economic development and prosperity. Discussion on transport infrastructure in this section will focus on roads, railways, airports, seaports and services provided by the sector networks that are crucial in moving goods and services from exporting and importing countries to Africa. It will examine how key infrastructural services support and impact on trade and development in Africa.

Transport infrastructure plays a crucial role in the flow of international trade and therefore needs to be more efficient and effective. Making infrastructure facilities more functional may involve government policy measures and regulatory reforms that will be complementary to the provision of high-quality physical infrastructure for trading. Trade depends on institutional quality and exporter's and importer's access to well-developed transport and communication infrastructure systems.

Logistics infrastructure in Africa will be examined from two critical perspectives: transport infrastructure and regulatory reforms.

2.5.1 Transport Infrastructure

Freight transport infrastructure is the bedrock of Africa's trade and economic development. However, lack of effective, well managed infrastructure that allows reliable transport services is the single largest barrier to trade in the continent. New Partnership for Africa Development (NEPAD) (2010) reported that the challenges inherent in creating an infrastructure network that will not only connect Africa with the rest of the world, but also integrate individual countries within the continent itself are many. This section examines the current state of Africa's transport logistics infrastructure system, including road, rail, sea/waterways and air as they are closely connected to the economic, technological and social renaissance of Africa.

Road Transport Mode Road transport is the most dominant mode of transport in Africa. It accounts for 80% of goods traffic on the continent. Road freight generally bears the brunt of poor infrastructure and that constitutes a considerable challenge for logistics in African trade and economic growth. The road transport system is affected by a variety of issues including road infrastructure development and maintenance, truck fleet management and maintenance, road safety, human and institutional capacity building, gas emissions, the environment as well as financing, among others. Many countries on the continent do not have adequate human and financial resources to construct roads and maintain them to international standards. In Africa, road network development has been inadequate, and existing roads are poorly maintained, resulting in a perennial bad road network, especially during rainy season.

The challenges of difficult topography, heavy vegetation and roads being destroyed by overloaded trucks have meant that logistics and supply chain operations have not had much impact. The lack of a defined strategy for road freight transport infrastructure has not made it possible for other transport modes such as air, rail and shipping to complement road freight in an inter-modal context.

Additionally, factors such as war and conflicts have prevented progress in road construction. Regional conflicts have led to the destruction of roads and river crossings as well as the prevention of maintenance and the closure of vital links. For instance, Sierra Leone, Liberia, the Democratic Republic of Congo and Angola have experienced retarded development following wars. Wars in the Democratic Republic of Congo set back the development of road infrastructure in the country by decades and cut the principal route between East and West Africa. Similarly, for many years, security considerations due to conflicts have restricted road travel in southern parts of Morocco, Algeria, Libya and Egypt as well as in northern Chad and much of Sudan.

As a means of addressing the problems of road transport, the United Nations Economic Commission for Africa (UNECA), the ADB, and the African Union in conjunction with regional and international com-

munity developed a plan for a trans-African highway network comprising transcontinental road projects in Africa. They aimed to promote trade and alleviate poverty in Africa through highway infrastructure development and the management of road-based trade corridors. The road network strategy, with a total proposed length of 56,683 km (35,221 miles), aimed to link Africa's capitals and other commercially important centres of production and consumption. It was designed to encompass nine major routes: Cairo to Gaborone (Pretoria/Cape Town), Lagos to Mombasa, Dakar to Djamena, Ndjamena to Djibouti, Algiers to Lagos, Beira to Lobito, Tripoli to Windhoek (Cape Town), Lagos to Nouakchott, and Cairo to Dakar. When completed, the road had been estimated to generate an expansion of overland trade of USD 250 billion over 15 years.

However, to date the continent is yet to fully achieve the implementation of the trans-African road network objectives due to lack of adequate overland links between the countries, and a lack of economic and political will by national governments to construct motor-able roads in individual countries. Despite the limitations posed by individual national governments however, regional community blocs are positively involved in the trans-African highway development as they work in conjunction with ADB and UNECA on projects within their economic zones. Notable examples of such projects include:

- the Arab Maghreb Union – driving the development and maintenance of the Tripoli to Nouakchott highway;
- the Economic Community of West African States (ECOWAS)—driving the development and maintenance of the Dakar to Ndjamena and Dakar to Lagos corridors;
- the Beira to Lobito highway—linking Angola to Mozambique;
- the highway to link the southern ends of Tripoli in North Africa to Windhoek in Namibia and further to Cape Town in South Africa;
- the Cairo to Gaborone highway, which makes use of regional highways developed by the Southern African Development Community (SADC); and
- the SADC – with an extensive network of road projects and trade corridors in Southern Africa. SADC manages road and rail corridors from landlocked areas to ports.

The East Africa Community is the fastest-growing bloc on the African continent. Success has been incremental but effective. Since 2008, freight volumes through East Africa's major ports, Mombasa and Dar es Salaam, have grown at 8% and 13% per annum respectively. With this growth came major transport and logistics investment opportunities that handled the increased freight volumes. But there are still areas of stalled or stunted regional initiatives to remove barriers to trade and investment. For many smaller economies, especially the landlocked ones, regional integration should be a necessity in their policy. Building trade blocs with neighbouring countries will help small landlocked countries to get access to ports. This will help them to achieve economies of scale, facilitate investment, break into multi-country production networks and increase private sector competitiveness. The strongest elements for integrated economic transformation however are the necessary political will, visionary leadership, a focus on delivering tangible development and joint monitoring by both public and private sectors.

Although a pan-Africa road infrastructure alliance to facilitate trade has not been fully achieved, the efforts of regional economic alliances, as mentioned above, in facilitating trade among member countries are encouraging. It is noteworthy that countries within the individual alliances have benefited from regional integrations through free movement of goods within their communities.

Box 2.4 The Dangote Group

The Dangote Group operates the largest fleet of trucks in Africa with over 10,000 trucks deployed for logistical activities, distributing a variety of products such as cement, flour, pasta and sugar across the African Continent.

Aliko Dangote, Africa's richest man and foremost entrepreneur, is setting up a $100million Vehicle Assembly Plant in Lagos, Nigeria. The Plant will be producing heavy duty trucks for distribution of products both locally and across the continent. The Dangote Group project will be partnering with a leading Chinese company, National Heavy Duty Truck Group Company Limited, SINOTRUCK to produce several thousands of trucks for haulage movement. The multi-million dollar deal signed in May 2014 in China will have an assembly Plant that would produce 10,000 trucks annually. In the partnership equity stake, Dangote Group will own 60 per cent whilst SINOTRUCK will retain the remaining 40 per cent. This initiative is expected to boost entrepreneurship and economic development across Africa.

Culled from *Nigerian Vanguard Newspapers*, 16 January 2017.

The Aliko Dangote initiative (Box 2.4), is an example that can be replicated by national governments, regional economic blocs and the African Union. As found by other developed economies, it is imperative to focus on collective approaches to strategic and transformational movement with the purpose of strengthening logistical resources and management capacity with the necessity to leverage support for continental logistics infrastructure. It is vital to identify Africa's logistics requirements and align those needs with achievable and realistic targets.

Rapid gains in the efficient transportation of goods and services across Africa can be achieved with the elimination of bureaucracy and road block bottlenecks. Reducing the time taken for the movement of cargo from Mombasa to Uganda from 18 days to five days should not require a significant investment of money. It should be about doing what is right and getting it right to eliminate the waste of time and effort.

Rail Transport Railways are the most cost-effective way of moving bulk cargo long distances over land. Rail freight is vital to Africa's economic well-being. It has an essential place in providing an efficient movement of goods and services across the continent of Africa and creating value through its part in an integrated supply chain.

Trains are most useful in the movement of containerised goods between ports and capitals. The huge capacity of trains to carry large quantities of goods and deliver cargo to destinations along the supply pipeline as they move from depot to depot makes railway distribution more cost effective compared to that carried out by road. Rail freight distribution is also more sustainable. Trains burn less fuel per tonne mile than road vehicles and can have as many as 30 wagons while requiring only one driver. The additional benefit of the railway is its safety: the security of freight in transit, a lower incidence of accidents, reductions in road congestion, and lower levels of fuel emissions are significant characteristics of rail transport.

Rail freight has a particularly large potential for Africa's current and future development as containerised imports and exports increasingly become the basis of international trade. The development of rail transport has begun to attract increasing attention from national governments across Africa.

Box 2.5

2.5.1 Kenya Standard Gauge Rail

In Kenya, there is the construction of a 500 km standard gauge railway from Mombasa to Nairobi, aimed at cutting the traveling time between the two destinations from 13 hours to 4 hours with a train speed of 80 km h^{-1}; and a 1250 km rail line that runs from Mombasa to Kisumu to Malaba with the purpose to reduce cost of cargo transporting by 60% at the completion of the project. The rail project is designed to link Kenya's neighbours: extending from Mombasa to Nairobi, linking Kisumu through to Kampala in Uganda, and South Sudan, and Kigali in Rwanda, then to Juba, connecting four countries together. The regional rail project had been designed to boost East African trade and development as well as deepen economic integration in the region.

2.5.2 Angola Standard Gauge Rail

The railway route is 3523 km long and connects Lobito in Angola to Beira in Mozambique, running from border to border, crossing Angola, the most southerly part of the Democratic Republic of Congo (DRC), Zambia, Zimbabwe and central Mozambique. This means copper can be easily transported from DRC to Angola and to the Atlantic Ocean for export. The project was designed to have a profound impact on business in Central and Southern Africa.

2.5.3 Ethiopia's Light Railway Project

Ethiopia has been slow to embrace railway transport for decades. The diesel-powered Addis Ababa–Djibouti city railway built by the French in the twentieth century has long been dysfunctional, but in 2011 the Ethiopian government agreed a contract with the Chinese to build a light railway transit that can transport 15,000 passengers per hour in each direction. The train will speed up passenger journeys and provide an alternative means of public transport to the city's road-based system as well as provide a more environmentally friendly transport option. The national electric rail project costing USD 475 million, covers 34 km (21 miles) of light rail and it is a joint venture between Ethiopia and China and is the first of its kind for the city and sub-Saharan Africa. The light rail system, which was part of a five-year "growth and transformation" project of the Ethiopian government became fully operational in 2016. Although the light railway is passenger focused initially, it may be useful to conduct business and move goods in the future.

2.5.4 The Abuja–Kaduna Gauge Rail Project

The project was expected to open up the northern part of the country as it is designed to connect the line that runs from Lagos to Kano. It was designed to carry more than 5000 passengers daily, with trains travelling at 160 km

per hour and carrying more than three million tonnes of cargo annually. On completion, the train journey will take 90 minutes, a journey that normally takes three hours by road. The railway is being built in segments. Only the section between Abuja and Kaduna has been completed so far, and services began officially in July 2016. The leg between Lagos and Ibadan is under construction. A USD 1.53 billion contract was awarded in 2012 to the China Civil Engineering Construction Corporation for construction of the Lagos–Ibadan segment (156 km) of the standard gauge railway by 2016. However, the project has faced delays. A ground-breaking opening ceremony finally took place on 7 March 2017 and the railway is expected to be completed by December 2018.

Other parts of the construction that have not yet started are: Ibadan–Ilorin (200 km), Ilorin–Minna (270 km), Minna–Abuja, and Kaduna–Kano (305 km). When all phases are completed the rail will link Lagos from the sea to Kano in northern Nigeria.

2.5.5 First High Speed Rail in South Africa

The 80 km Gautrain rapid rail link has brought high-speed commuter communications to Gauteng province, the smallest of the country's nine provinces, but the most important economically and the most densely populated. Gauteng is at the heart of the South African economy. It creates one-third of South Africa's GDP and is home to around 10 million people, one-fifth of the country's population. It also includes the country's largest city (Johannesburg) and administrative capital (Pretoria), as well as the OR Tambo International Airport.

With the provision of the high-speed transit link, the government's expectation was to stimulate economic growth and job creation by improving commuter mobility as well as reduce traffic and carbon emissions on congested highways.The contractor, ABB traction technologies, is playing a vital role in the project by providing advanced traction solutions that powers the entire 80 km line and the 24 electric trainsets that operate at speeds of up to 160 km h^{-1}.

Box 2.5 (2.5.1 to 2.5.5) contains stories of African efforts on investment on rail transport infrastructure for the facilitation of trade and economic development in the continent. They however need to do more by giving optimum support and attention to the success of the trans-African highways network initiative of ADB and UNECA to facilitate the movement of goods and services for efficient and effective intra-African continental trade.

Sea Transport Maritime trading dominates exports and imports. It is less agile but cheaper than the other modes of transport. Shipping in African trade is notable as the traditional means of moving large amounts of cargo from Africa to other continents. However, the facilities at African seaports are still behind the global acceptable level due to the poor level of investment in port infrastructure, thereby limiting the pace of trade to and from the continent. In order to respond to international market demand and competitiveness, Africa will have to refocus its sea transport strategy to improve and enhance cargo services to and from their extra-African trading partners. The adoption of modern shipping transport technology that enables ships to propel quicker and cruise faster will require innovation in African trade logistics. Indigenous African traders doing business in the continent will also benefit from modern port-centric technologies that will enable trade to flow across national coasts in Africa.

Sea ports are the key enablers of inter-modal transport connections. For instance, landlocked countries in sub-Saharan Africa can be served by connecting waterways, road and rail transport to the west coast ports of Lagos in Nigeria and Dakar in Senegal, the ports of Dar es Salaam in Tanzania and Mombasa in Kenya on the eastern seaboard, and the three southern ports of Durban, Maputo and Cape Town. Other newly developing African ports, such as the port of Lamu in Kenya, can serve as a gateway connection to Southern Sudan and the Democratic Republic of Congo, while Nacala and Beira ports in Mozambique will serve the SADC region. Although the impact of these new ports may be small, their network connections with road and rail infrastructure can help to open up the African hinterland.

A major disadvantage, however, is the vulnerability of the landlocked countries. In the event of any crisis that closes a port of trade, landlocked countries will be directly affected. For instance, incidents like the 2007 Kenyan election protests affected the output of Mombasa and the Transnet strike in South Africa closed down Durban port for several days, so goods did not reach the inland countries they would normally serve.

Inland Canals and Waterways Transport on rivers, lakes, lagoons and canals is crucial to logistics infrastructure and trade. The Nile, Niger, Congo and Zambezi are important transport routes. Similarly, lakes used for transport include: Lake Victoria in East Africa; Lake Malawi in Southern Africa; and Lake Chad in West Africa to mention just a few.

Water transport is excellent for goods transportation, particularly in riverine areas in most African countries where there is a lack of or limited access to communities and goods that need to be moved around the hinterland.

2.5.1.1 Air Transport

The African continent is characterised by vast areas of land with no good roads or railway network. Transport by air, therefore, would seem to be the strong option for freight movement and distribution. Air cargo services have witnessed a gradual increase in the last few decades, however, the domestic air market has shown a very low level of development and international cargo flights have remained restricted by anti-competitive regulations across African continents.

Despite Africa having 15% of the world's population, the 230 airlines operating in African airspace operate just 5.5% of the world's commercial and freight aircraft. The main reasons for such a small number of air services in Africa are due to air infrastructure shortages and limited competition in the air cargo market. In addition to this, there is a lack of a well developed network of domestic airports and air cargo services, which proves particularly problematic in Central and Western Africa.

As the number of middle class households is on the rise in Africa and estimated to reach 128 million in 2020, growing from 85 million in 2008, it is expected that a corresponding demand for goods will increase, people will travel more and buy more goods (McKinsey 2015). Air transport therefore plays a critical role in the distribution of goods to landlocked African countries such as Niger, Mali, Burkina Faso, Luanda, Rwanda, Burundi, Zambia, Botswana, Zimbabwe and Central African Republic where land routes can be rough and lengthy with a high risk of delay at the borders. The International Air Transport Association reported that in the last quarter of 2014, Africa enjoyed a 10.5% growth in demand measured

in freight tonne kilometres, which represents twice the 4.2% growth of the global freight market over the same period. This indicated a strong demand for air freight from importers and exporters. In twenty-first-century Africa, companies are increasingly opting for air instead of sea transport for urgent shipments of products, particularly in crude oil and pharmaceuticals. Hughes Marchessaux, air freight director at Bollore Africa Logistics, emphasised that the development is a reflection of the global market for air transport that accounts for just 1% of the volume of goods transported but 35% of the value. Up to 2018, however, Africa remains the smallest user of air services in the world due to its low income and lack of air transport infrastructure, despite the air transport sector being a major contributor to African trade particularly for time-sensitive products such as agricultural produce and intermediate production networks.

Although it is difficult to find detailed data on intra-African air transport, The international Bank for Reconstruction and Development (IBRD)/The World Bank (2009) indicated that air freight is crucial to developing countries, particularly the landlocked countries. According to the report, landlocked African countries have limited demand for air freight because most of the enterprises are small businesses with low production capacities and low-value goods such as flowers, fresh fruits and vegetables, and electronic parts, which only require small volume of shipments. The critical strain for African enterprises is the ability to generate production capacity to attract air freight services that are both frequent and competitive. Air transport costs in Africa are above the world average, thereby inhibiting the development of exports with high value added. This stems from the belief that fuel tends to be significantly more expensive in Africa than in other regions. For instance, fuel prices in Africa are often 40% higher than in Europe (Amjadi and Yeats 1995). Amjadi and Yeats estimated that air transport cost represents, in some cases, up to 50% of the value of African exports to the USA. High and rising costs of air transport services have a direct impact on the cost of cargo flights to Africa. IBRD/World Bank (2009) reported that in the short run higher cost of fuel would normally result in a possible downturn of air cargo traffic, and in the long run, with a continuous, albeit slow, growth, air freight would be integrated into multi-modal supply chains that could provide some form of balance between cost and time. The report further stated that air freight would also open new markets by providing fast, reliable service for initial deliveries of products, and continue to support production activities and delivery of critical

spare parts and high-value inputs. The report also emphasised the significance of air freight in supporting reverse logistics activities including repairs and warranty work for electronic and other high-value consumer goods.

Other militating factors include the variation in the quality of air infrastructure across the continent; difficulties in finding airports big enough to accommodate some of the larger cargo planes, especially in sub-Saharan Africa; and the lack of ease of loading and unloading at some airports due to inadequate landing equipment.

African governments' slow response to liberalise is a critical issue in inter-African air markets. Liberalisation can stimulate both intra- and inter-continental demand for air travel and create competition and service improvements, as well as lower costs that may accumulate while business is being conducted.

Air transport infrastructure is a necessary condition for economic growth and, though it cannot reduce poverty in itself, it has a key role to play as a facilitator of policies that aim to improve living standards. In twenty-first-century global trade, air transport has played a key role in fostering economic development and making countries more competitive and productive. Aviation therefore has the potential to make an important contribution to Africa's continued economic growth because it can help open markets and facilitate trade.

InterVISTA reports (2015) reviewed the Yamoussoukro Decision of 1999 signed and adopted by 44 African countries as full liberalisation of intra-Africa air transport services in terms of access, capacity, frequency and tariffs; fair competition on a non-discriminatory basis; compliance with international safety standards; and a requirement for implementation of the agreement. The report, however, noted that the implementation of the Yamoussoukro Decision still remains to be seen. This is because there are still constraints such as:

- protectionist policies favouring national airlines;
- discriminatory practices in favour of other continent's carriers;
- severe restrictions on African carriers; and
- non-physical barriers such as harsh visa requirements.

African countries will need to work more collaboratively for the benefit of African trade and development. An emergence of an attractive inter-

African market will encourage a trend towards new alliances and acquisitions. Good examples are South African Airways acquiring a 49% share of Air Tanzania and a restructured Kenya Airways sold to private investors.

2.5.2 Regulatory Reforms

Logistics infrastructure often requires government ownership or regulatory control because of its inherent monopolistic nature. Roads, rail, seaports including waterways and airports are the most common infrastructure elements that exist along nodes and links of transport network systems in Africa and governments play a dominant role in the building and maintenance of these facilities. Nevertheless African governments still have a relatively weak consideration for a common legal framework to cater for the complexity and cost of regulatory processes necessary for trans-African logistics and supply chain network design.

In order to make the impact of logistics infrastructure feasible, the existing complex and bureaucratic port regulations in Africa need a review in order to eliminate unnecessary administrative activities at rail and road borders and at sea and airports. Deregulation of the system to remove needless requirements will enable freight agility across the continent. A new legal framework to remove out-of-date tariff structures and archaic restrictive laws, as well as to identify and confront non-tariff barriers such as corruption, to facilitate movement at the borders in order to ease intra-African and Afro-inter-continental trades are policy measures that will enhance efficiency and increase competition.

Although institutional reforms are steadily taking place in the African freight transport sub-sector (Box 2.6), many countries have yet to adopt a global best practice approach. In contrast, in developed continents such as Europe and North America, transport infrastructure assets have embraced the public–private partnership approach in ownership, maintenance and financing, allowing deregulation and market forces as an effective mechanism for competitiveness. Liberalisation (privatisation and commercialisation measures) will help to improve financial performance through value-added and efficient use of logistics infrastructures.

Weak institutions that have a negative impact on trade, a poor management of ports and borders as well as cumbersome custom procedures

accompanied by extortions that contribute to delays and a slow down of supply chain activities need a stronger regulatory framework.

Box 2.6 Transport and Trade Facilitation

A number of bilateral agreements on international road transport have been signed by several African countries. For example, The Central African Economic and Monetary Community (CEMAC) Trade Corridor Project in 2006 approved transport facilitation master plan aiming at improving efficient regional trade among member states and improved access to world trade.

In West Africa, the Economic Community of West African States (ECOWAS) and, the West African Economic and Monetary Union (UEMOA) members states agreed a convention that provides guidelines for road transport services for uninterrupted transit across country boundaries. The regional community also agreed to improve the implementation of the common vehicle insurance scheme known as the Brown Card. The scheme also covers third-party liability and medical expenses as well as the Automated System for Customs Data (ASYCUDA), aiming towards overcoming delays in reporting of traffic movements and locations. Similarly the Inter-state Transport convention (TIE) and the Inter-state Road Freight Transit convention (TRIE) adopted in 1982, aimed at the establishment of joint border posts, which, among other things, would accelerate the traffic and address issues of variations in working hours at adjacent border posts.

In Southern Africa efforts to improve trade facilitation include the launching of the Regional Trade Facilitation Program (RTFP), a key component of which is the One Stop Border Post (OSBP). The OSBP involves measures including harmonization of customs clearance procedures at border crossing points.

Similarly, in Eastern Africa, the OSBP aimed at improving the efficiency of rail traffic between Kenya and Uganda has been established at Malaba. In the Eastern and Southern Africa sub-region, COMESA and SADC have adopted a number of protocols related to transport facilitation. They have also adopted measures for facilitating transport and transit between their member states. There are also plans to bring down the number of road blocks between Kenya and Uganda on its Northern Corridor (which comprises a rail and road network that links Kenya to the Great Lakes countries of Burundi, Democratic Republic of Congo, Rwanda, Southern Sudan and Uganda) from the current 47 to 17.

In a similar move aimed at improving transport and trade facilitation, a corridor management mechanism of the Central Corridor linking the great lake countries to the port of Dar es Salaam was put in place in 2005. During the same period, preparations were underway to establish corridor management groups for the North-South Corridor, linking DR Congo, Zambia, Zimbabwe, and Malawi following the implementation of the corridor management initiative important results have been achieved. For example, the journey time from Mombasa to Kampala, had been reduced from 10 to 6 days.

Source: UNECA Report, October 2009*.*

2.6 The Future Impact of Logistics and Supply Chain on Trade and Development in Africa

There is a fast-growing demand from around the world for the vast raw commodities available on the African continent. Africa has an abundance of oil, gas and mineral resources with significant opportunities for agricultural expansion. Experts view that Africa is growing more strongly in 2018 than at any time in its recent history with its rising wealth creating a surge in demand for a broad range of products. Meeting that demand across Africa's diverse physical, economic and political conditions will require companies trading in Africa to be extremely innovative, flexible and proactive in their supply chain approaches.

Earlier in this chapter, we mentioned that the key issues hindering successful logistical operations in Africa revolved around inefficient links in Africa's supply chain model, resulting from inadequate infrastructure, high transport costs and complex regulations at the ports. The most successful traders in Africa will therefore be those that have an awareness of these limitations and recognise the advantages of managing their supply chains as a competitive business and positioning that as an essential component of their trading policy in Africa. They will have the ability to adapt their businesses and supply chain models to suit Africa's unique characteristics by harnessing resources to manage their operations efficiently and effectively. Africa has become an investment destination for many countries around the world, and transport logistics has taken on greater roles in African trade. Whether you are moving resources off the continent or bringing goods and services into it will continue to be determined by the nature and quality of infrastructure and the efficiency of Africa's transport networks.

Intra-African trade is low in comparison to its global counterparts for the reasons of poor infrastructure and because most economies in the continent are supply based. Currently only about 11% of Africa's trade is with other African trading partners, compared to Asia where half its trade is between the countries in the Asiatic region. There are transport

infrastructure barriers to trade and it takes a substantial amount of time and money to cross borders. Political will among African governments is needed to establish transport logistics policies that will give adequate consideration to an African market of the future that will enable the building of an adequate infrastructure for efficient and agile supply chains and distribution networks, and ultimately support the creation of enterprise and economic growth and development. This new thinking should be part of a continental-wide trade agreement—a strong Africa free-trade zone framework in which removal of unnecessary tariff and trade barriers will be critical to accelerated economic development on the continent.

South Africa is rated the best performer in Africa in trade facilitation logistics and among the best in terms of transport infrastructure. South Africa's overall transport infrastructure is almost at the same level as that of India and better than that of Indonesia. But although South Africa continues to show strong infrastructure capability, it has the lowest projected annual growth at 3% for the period 2012–2017 of the ten economies surveyed (Band South Africa 2012).

As the need for gateways to connect Africa to the rest of the world is increasing, there are not enough ports to handle existing traffic. The plan to build and expand five major ports at Beira do Dande and Lobito in Angola, Lekki in Nigeria, Musoma in Tanzania, and Lamu in Kenya might bring hope for change. For instance, many multi-national companies desiring to expand into West Africa see Nigeria as a major gateway to the region. Nigeria is regarded as the largest market in West Africa, with a population of more than 180 million of the 250 million people living in West Africa. With 50% of the population living in urban cities and the middle class growing rapidly, Nigeria ranks as the world's fourth fastest growing economy, largely driven by oil exports. This makes the country a leading destination for international investors.

In recent developments in the last decade or so, the Chinese government and state-owned enterprises are looking to Africa for hydrocarbons and other raw materials. In return China is financing massive infrastructure projects in the sub-Saharan region. For instance, China is supporting a host of infrastructure projects in South Africa, Tanzania, Ghana, Mozambique and Nigeria.

Similarly, Ghana with its current favourable business environment, is also gradually establishing itself as an important gateway to the West African market. With a similar optimism and despite the constraints in its growth potential and its inadequate logistical infrastructure, Mozambique will progressively become the fourth largest exporter of liquefied natural gas globally and the second largest in Africa after Nigeria, according to the Organisation for Economic Co-operation and Development.

An interesting feature of note is that each country in Africa has its own value proposition despite their urgent need for investment in road, rail, air and port transport infrastructure to support trade and economic growth. International investors will have to recognise the potential in Africa and be encouraged to partner with governments to invest in transport and logistics infrastructure in order to unlock the economic value of the continent and provide businesses with great opportunities for a better trade environment.

In conclusion, the African continent needs better transport infrastructure, more connectivity across borders and an improved business environment to reach its potential. African governments must provide the required enabling environment for trade. They need to realise that the ability to compete as a region in a global economic arena is critical and dependent on an efficient and effective logistics system. It is therefore important to develop knowledge that will enable international supply chain partners and industry sectors to collaborate for improved international competitiveness and to influence the development of the national system to address holistic logistics requirements.

The inclination to adopt and apply modern technology is another area for improvement and development. The complexities and scale of transport logistics in the twenty-first century have necessitated the introduction of information and communication technologies to determine routes and distances between points more accurately. Advanced port technology is most needed in African ports to facilitate quicker and easier processing of cargoes for the purpose of decongesting ports and to enable efficient and timely movement of goods to distribution centres. The topography of Africa presents unique, varied and continually evolving challenges to supply chains; therefore the continent needs more modern

and user-friendly advanced technologies at the various ports for the benefits of both domestic and international markets.

Logistics efficiency will be improved if decisions are based on accurate information. In Africa, like everywhere else, during the initial uptake of technology, businesses tend not to share information with their trading partners for fear of losing a comparative advantage. However, there is a strong need to understand the significance of modern electronic technologies in facilitating business communications and synchronising logistics and supply chain processes and activities both in intra-African and with Afro-inter-continental trade partners. Greater investment in advance electronic transport and communication technologies will turn out to be to the benefit of Africa, Technology will enable quicker, better and fairer trade that will have a major impact on trade across the African continent and make Africa's value chain much easier to achieve.

References

Adewole, A. (2003). PhD Thesis. University of the Arts London.

Amjadi, A., & Yeats, A. J. (1995). *Have Transport Costs Contributed to the Relative Decline of Sub-Saharan African Exports? Some Preliminary Empirical Evidence* (Policy, Research Working Paper; No. WPS 1559). Washington, DC: World Bank.

Brand South Africa Report. (2012, November). *South Africa's Transport Network.* South Africa.

Brigsten, A. (2018). Determinants of the Evolution of Inequality in Africa. *Journal of Africa Economies, 27*(1), 127–148.

Chuhan Pole, P. (2017, April 19). *Economic Growth in Africa Is on the Upswing Following a Sharp Slowdown* (World Bank Report).

Fosu, A. K. (2018). Economic Structure, Growth, and Evolution of Inequality and Poverty in Africa: An Overview. *Journal of Africa Economies, 27*(1), 1–9.

Human Development Reports. (2009). *United Nations Development Programme*. New York: International Air Transport Association Report.

IMF Reports. 2013.

InterVISTA Reports. (2015, December). *The Yamoussoukro Decision – Transforming Intra-African Air Connectivity: The Economic Benefit of Implementation the Yamoussoukro Decision*. Geneva: International Air Transport Association.

Matsaert, F. (2015, February 13). *Delivering Development: Why Logistics Is Critical for Africa's Growth?* Geneva: World Economic Forum.

McKinsey Quarterly Reports. (2015). *The Outlook of Global Growth (and Various Editions)*.

NEPAD. (2010). *Annual Report*.

Schwab, K. (2009). *The Global Competitiveness Report*. Geneva: World Economic Forum.

Thorbecke, E., & Ougang, Y. (2018). Is the Structure of Growth Different in Sub-Saharan Africa? *Journal of African Economies, 27*(1), 66–91.

UNECA Report. (2009). *The Transport Situation in Africa.* UN Sixth Session of the Communities on Trade: Regional Cooperation and Integration.

World Bank Report. (2013). *International Monetary Fund: United Nations Conference on Trade and Development (UNCTAD)* (World Investment Report). McKinsey Global Institute Capital Flows Database.