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India's Export Opportunity in Africa: Issues and Challenges in Select Sectors

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India's Export Opportunity in Africa: Issues and Challenges in Select Sectors

Rakesh Mohan Joshi*
Biswajit Nag**
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Abstract

The paper focuses on bilateral strategic cooperation between India and Africa highlighting that some of the fastest-growing economies in the world are now in Africa. It has analyzed the overall trade dynamics between India and Africa in select sectors, where two dimensional scatter diagrams (average export growth and average export value) are used to identify the countries which are poised for economic growth in the selected sectors. Further Constant Market Share Analysis (CMS) model is used to understand the reason of export growth and more precisely the role of competitiveness gain in African market. The paper also discusses the non tariff barriers faced by the Indian counterparts.

JEL Classification: F-13, F-14, F-15.

Keywords: Constant Share Market Analysis, Export, growth, Investment, Strategic Cooperation

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1. Introduction

Africa is now considered as a continent poised for economic growth, the reasons of which lies deep rooted in economic, resource and operational factors. Africa today is the 3rd fastest growing economic region in the world. The rate of urbanization is higher than India and lower than China. It is the continent which comprises of some of the world fastest growing economies. According to World Bank data, Africa is richer than India on the basis of GNI, and a dozen African countries have a higher GNI per capita than China.

Africa offers among the world's best investment prospects. Also a shift of global economic power to emerging giants benefits Africa. Large economies such as China and India are seeking resources from Africa thus pushing up commodity prices internationally and providing investment opportunities in African countries. While barriers to entry in Africa are high, companies that develop strong distribution networks and acquire deep understanding of market forces can generate high margins. Sectors that offer investment opportunities include oil and gas, telecom, infrastructure and information technology. Two years ago Bharti Airtel acquired African assets of Kuwaiti Telecom firm Zain for US $10.7billion[1]. Companies that have evaluated market opportunity and understood consumer base are enjoying remarkable growth rates ranging from 30 to 60 percent year on year. As far as trade is concerned, Recently India has overtaken the US to become Nigeria's largest export market. Nigeria's exports to India are mostly crude oil and cashew nuts while India exports pharmaceuticals, machinery, electronics, and rice.[2] Also Trade between Africa and the rest of the globe increased by 200 per cent between 2000 and 2011. Apart from the usual exports of oil, natural gas and minerals, the sale of African-manufactured goods is also increasing. Over the past ten years, African manufactured output has doubled.[3]

Some of the fastest-growing economies in the world are now in Africa. The charts below shows the top 12 fastest growing economies in the year 2011 and it is evident from this table that many amongst them are African economies. Ghana, Liberia, Angola, Ethiopia Mozambique are growing faster than many Asian economies. In next few years some more African countries such as Niger, Zambia, Uganda, and Tanzania are expected to join the league[4].

[1] Hindustan Times (27/3/2012): Is Africa next hub for Indian Firms?
[2] Economic Times (24/6/2012) : India overtakes US as Nigeria's biggest export market
[3] The Independent (6/8/2012): Economic Growth stirs hope In Africa
[4] Source: economywatch.com forecast for 2016

Table 1: Top 12 Fastest Growing Economies (2011)

Country	GDP Growth (Constant Prices)
Ghana	20.15%
Qatar	14.34%
Turkmenistan	12.18%
China	9.91%
Liberia	9.00%
India	8.43%
Angola	8.25%
Iraq	7.87%
Ethiopia	7.66%
Mozambique	7.55%
Timor Leste	7.40%
Laos	7.40%

Source: Economywatch.com 2012

2. Objective

The objective of the paper is to identify the sector specific opportunities for Indian economy in Africa based on global trade of Africa, overall economic relationship between India and Africa especially in bilateral trade and investment. The paper aims to analyze the dynamics of the potential sectors in Africa selecting some of the emerging markets and scrutinizing whether the export growth is due to rising demand, diversification of product basket or due to competitiveness. It will also explain the nature of barriers in those sectors and what could be a policy drive for Indian government to have a better market access. The paper gives impetus to necessary strategic policy recommendations and potential interventions for the identified sectors.

3. Methodology

The paper has analyzed the trade data in details considering both India's exports and global imports of African countries. It has also identified major barriers to Indian exports in African countries looking into various secondary sources including reports and websites. At the initial stage the methodology is divided into two targets: identification of sectors and selection of countries for analysis. As it is not possible to bring all products and countries under analysis, the paper has undertaken following methods to shortlist them.

The identified sectors show high exports from rest of the world to Africa and also they experienced high compound annual growth rate from India. These are amongst the major products imported by Africa from rest of the world as per their import statistics. Availability and consistency of data has been a major concern. This has been also considered while selecting the products. Reports on Indian companies entering into African companies also helped us in understanding importance of various sectors[5]. In terms of exports, Indian firms have remained much focused over the years and they have increased their export intensity in recent past[6]. Pharmaceutical products, automobile and components, machinery, metal products etc. are among India's top exportable products to African countries and consistently they occupied major share in African global imports as well. While selecting these products we have also kept an eye on various studies on India's capability to export of these products considering current domestic demand requirement. Things can only get better as the Indian government steps up trade relations with Africa. Table 2 below provides a snapshot of African demand of these four products.

Table 2: Products in which India has opportunities

Product Name	**Imports from world**	**Imports from India**	**Import growth from World**	**Import growth from India**
	Million US $ in 2011		CAGR % (2001-2011)	
Pharmaceutical Products	18692.10	1666.07	11.67	22.95
Iron and Steel	17229.10	916.02	13.25	22.76
Mechanical Machinery	94471.77	1165.75	6.29	20.97
Automobiles and its components	82868.01	2453.75	6.47	31.5

Source: WITS, India Trades

[5] Hindustan Times (27/3/2012): Is Africa next hub for Indian Firms?
[6] Business today (10/5/2011) : Africa is the next big frontier for Indian Companies

To select the prospective countries with export opportunity from the continent the paper has scrutinized both India's export value to African countries (Avg of 2001 -2011) and its country specific export growth (Avg growth during the period 2001-2011). On the basis of these two variables African countries have been placed and ranked in two dimensional scatter diagrams. The diagram is then divided into four quadrants based on the 'average of country data'. Hence the vertical line represents the average of country specific export values calculated from the export values of all selected countries. Similarly, the horizontal line depicts the average growth of India's exports to all African countries. Thus, the scatter diagram is divided into four quadrants. The quadrant one represents a situation of high growth and high export value. These markets capture significant opportunity and they are matured. Second quadrant stands for high growth but low export value thereby govt. of India must identify them as potential markets and provide incentives for export growth. Third quadrant consists of low growth and low export value. These markets don't attract value to Indian products. Fourth high export value yet low growth or a decelerating saturated market. We need to maintain the market share there. So, competitive strategy like investment on brands, promotional activities are necessary. Some of such markets may be small in size and we need to keep this in mind while selecting such countries.

At the second stage, the paper concentrates on the dynamics of export growth of selected products in short listed countries through the above procedure. For this purpose Constant Market Share (CMS) model has been picked up. CMS analysis is a popular tool for analyzing changes in exports of a country. The model used in this paper has been inspired by the work done by Ichikawa (2003), Richardson (1971), Fagerberg and Sollie (1987), etc. The intrinsic norm of this analysis is a country's export share in a given market should remain unchanged over time. However, in reality trade is dynamic and market share keeps on changing. The difference between the actual export growth from a member country into a given market and the unchanging export share implied by the 'constant-market share norm' is attributed to the following three factors:

1. The effects of a general increase in demand for imports in the given market
2. Commodity composition, and
3. Changes in competitiveness

Keeping the market share constant, the model expresses the competitiveness term as negative or positive to adjust the actual change in market share.

$$X(t) - X(0) = mX(0) + \Sigma\{(m_i - m)\, X_i(0)\} + \Sigma\{X_i(t) - X_i(0) - m_i X_i(0)\} \quad \ldots\ldots\ldots(1)$$

X: exports of country A to country B

X_i: commodity i exports of country A to country B

m: Percentage increase in country B's total imports from period 0 to period t

m_i: Percentage increase in country B's imports of commodity i between period 0 to period t

and $X=\Sigma X_i$

The right hand side can be divided into three components

(a) The general rise in country B's total imports

(b) The commodity composition of country A's exports to B in period 0, and

(c) An unexplained residual indicating the difference between country A's actual exports increase to country B and the hypothetical increase if country A maintained its share of exports of each commodity group in country B.

The details discussion on Constant Share Model is given in the Appendix. The tables described in the paper with respect to CMS model considers that the sum of these three effects is always 100 and competitiveness reflected through residual is always adjusted accordingly. This is due to the fact the model by force brings down the market share to a constant level and measures the net change. It is important to note availability of detailed trade data on a continuous basis for African countries is the major limitation and hence to bring symmetry among the sectors, CMS has considered the data period of 2007 and 2009.

4. India-Africa Economic Relationship: Gaining Momentum

India's trade with Africa has doubled in the past four years, from $24.98 billion in 2006–07 to $52.81 billion in 2010–11[7]. This steady upward path on the trade front is being supported by stronger investment ties, with Indian companies in Africa totaling $1.52 billion in 2009–10. With the leadership on both sides committed to providing a business-friendly environment, bilateral ties are expected to continuously grow in scope and significance.

On India's side, economic growth is inevitably pushing the country to expand its footprint across Africa, including sourcing raw materials and energy to sustain industrial activities at home as well as securing new markets and consumers abroad for its expanding array of manufactured goods and value-added services. And on the African side, high commodity prices and robust external demand have provided more space for national governments to consolidate gains from improved macroeconomic management at home. This has enabled greater private capital flows, faster debt relief, and allocating greater resources to enhancing non fuel exports. The political and economic developments have substantially improved business opportunities for the international community and consequently, both trade and investment in Africa indicate a growing trend.

Africa today represents one of the largest untapped potential for investment as it is one of the richest natural resource regions in the world. Further, Africa has a middle class that is larger than India's, estimated at 350–500 million, with a rising per capita income and greater propensity to trade and to invest. The continent is today the third-fastest growing economic region in the world and its rate of urbanization is higher than India's.

[7] India Africa Investment Gateway

From India's perspective, the following sectors are seen to be of high importance: agriculture, healthcare and pharmaceuticals, textiles, automobiles including auto-components, metals (Iron and Steel) and minerals, IT & ITeS, banking and financial services, energy and infrastructure. To further expand India-Africa ties, a number of initiatives are underway to facilitate exchange of information, identify business related bottlenecks, expand business alliances, and facilitate technology transfers.

In all these efforts, an enduring cementing role is being played by the vibrant and pro-active Indian Diaspora. This community has not only been instrumental in building up the goodwill that India enjoys today in Africa, its entrepreneurial skills and love for closer bilateral ties will be an important ingredient in forging closer ties in the future, enabling both sides to enhance their economic wellbeing and their overall standing amongst the comity of nations.

Doing business in Africa adds several capital benefits to the Indian Investment that shows immense interest in Africa Investment. To leverage the business opportunities in Africa business, India has rapidly modernized the ongoing India Investment in the country. Due to rising income and increasing purchasing power of the African people a steep surge has been evident in resource-extractive commodities, agricultural goods like cotton. Other areas where India investment can easily be shown are light manufactured products, household consumer goods, food and tourism.

India has made substantial investments in Africa, Indian conglomerate BHEL is running 17-20 projects in the continent with more than 3000 people on work. Also the Tata Africa Holdings runs its presence across 10 African countries, with an investment of over 100 million US $. The Bharti Airtel investment in Africa is so far one of the biggest from corporate India. Bharti Airtel bought the Africa operations of the Kuwaiti operator Zain for $10.7 billion. Indian investment in Africa has increased by a sharp ratio and with encouraging trade policies between these two countries, phenomenon is about to take more pace in coming times positively. This is what the best part of the emerging business trends between India and Africa.

5. Product specific Opportunities:

5. (i) Health care and Pharmaceuticals:

The global pharmaceutical market in 2010 is expected to grow by 8.3 percent and will reach a level of $875 billion USD, driven by stronger near-term growth in the US market. In 2009, the pharmaceutical market grew only 3.5 percent with market size of $808 billion USD. At present, the global pharmaceutical market is dominated by the US, which accounts for about 28 percent of global sales in 2009, followed by the EU, accounting for nearly 15 percent, and

Japan nearly 12 percent. Together, these three markets represent nearly 55 percent of the global market[8]. African Pharmaceuticals industry is still at its infant stage. Though

[8] Source: IMAP's Pharma & Biotech Industry Global Report — 2011

Africa has made significant improvements in health care over the years but many challenges still persist. Capacity to handle ailments such as HIV, tuberculosis and malaria differ from country to country. New institutional and governance structures are needed to improve the performance of public sector programmes as well as create an enabling regulatory environment for effective health care delivery. The industry is entering a new era, with the development of infrastructure system and rapidly changing regulations.

Almost half the world's deaths of children under five take place in Africa. Approximately 7 out of 10 deaths in 2008 due to HIV AIDS were in Sub Saharan Africa. Africa carries 29% of the global burden of tuberculosis cases. This challenge is significant but not unachievable. There is a tremendous opportunity to leverage the private sector in ways that improve access and increase the financing and quality of health care goods and services throughout Africa. In a region where public resources are limited, the private sector is already a significant player. Around 60 percent of health care financing in Africa comes from private sources, and about 50 percent of total health expenditure goes to private providers[9]. Various constraints are being experienced in the healthcare delivery systems, namely weak health infrastructure, limited tools, inadequate human resource capacity, limited public financing to the health sector, poor management and planning and lack of integrated health systems and misapplication of human, technical and financial resources. Apart from lack of sufficient healthcare facilities, there lies other challenges like low awareness amongst people, low capability to pay, lack of skilled medical professionals , complicated rules in case of pharmaceuticals exports by other countries (Licensing , distribution authorization , product testing etc.). Several governments are now determined to change the current situation. The reforms that governments undertake over the next decade will be crucial to cutting mortality rates and improving health outcomes in the continent. For the vast majority of Africans still unable to pay for health provision, new models of care are being designed, as governments begin to acknowledge the importance of preventive methods over curative action. This, in turn, is empowering communities to make their own healthcare decisions.[10] This has given significant opportunity to India as it is poised to play a new role in Africa. With the partnership of African governments, India can offer an affordable South-South solution to cash strapped African nations.

The Indian Pharmaceutical Industry today is in the front rank of India's science-based industries with wide ranging capabilities in the complex field of drug manufacture and technology. It ranks very high in the third world, in terms of technology, quality and range of medicines manufactured. From simple headache pills to sophisticated antibiotics, almost every type of medicine is now made indigenously. This sector plays a key role in promoting and sustaining development in the vital field of medicines. [11] Indian companies are now making attempts to increase their R&D expenditure. The total

[9] Source: International Finance Corporation World Bank 2010
[10] Source: Report from Economic Intelligence Unit by Jannsen
[11] Comparative Financial statement Analysis & Innovation in Private sector Pharmaceutical Companies in India-An empirical Analysis: Ratish Kakkad

Indian production constitutes about 13 per cent of the world market in value terms and, 8 per cent in volume terms[12] .

Given the rapid growth of Indian pharmaceuticals industry and the scenario of healthcare in Africa, there exists extensive opportunities for Indian pharmaceuticals sector as India can make available the essential medicines at affordable prices on a sustainable basis. Social insurance services are also one option as its advantages include promoting equity, solidarity and affordability. Indian hospitals, medical professionals together with Indian medicines can provide the basis for this affordable treatment in Africa.

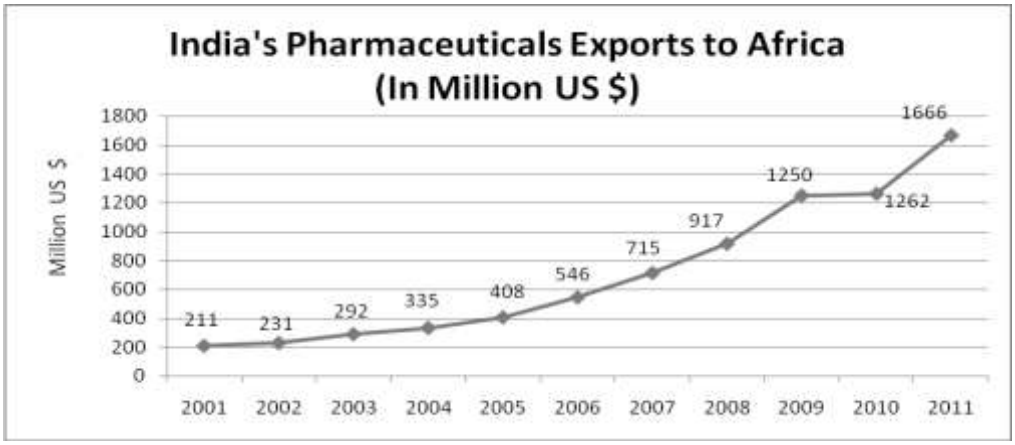

Fig.1 India's Pharmaceuticals Exports to Africa (In Million US $)

Source: India Trades, CMIE

Since 2005, India's export to Africa has increased by leaps and bounds. In 2005, mere US$ 408 Million was exported and in 2011, the figure has reached to US$ 1.6 billion. The new markets in Africa have become attractable destinations. Old markets such as in East Africa maintained their momentum. To shortlist the countries as described in methodology section, we have compared mean export value and mean export growth of Indian exports in major African markets. The details are given in Table 3. The values are plotted against 'Africa Average' in Fig. 2 to observe which countries are falling in which quadrants.

[12] Source: Indian pharmaceuticals industry report by corporate catalyst India

Table 3: Pharmaceuticals exports from India to African Countries

Importers	Mean Export Value (2001-11)	Mean Export Growth (2001-11)
Kenya	57.71	30.22
Ghana	43.73	26.28
Uganda	34.77	23.25
Tanzania	31.78	28.77
Ethiopia	24.57	40.08
Zambia	18.95	35.35
Benin	18.71	47.44
Angola	16.32	72.41
Mozambique	15.41	54.41
Cameroon	14.20	42.50
Zimbabwe	13.98	36.65
Algeria	13.86	42.20
Mauritius	12.77	26.45
Malawi	11.78	44.10
Average	**23.47**	**39.29**

Source: India Trades, CMIE

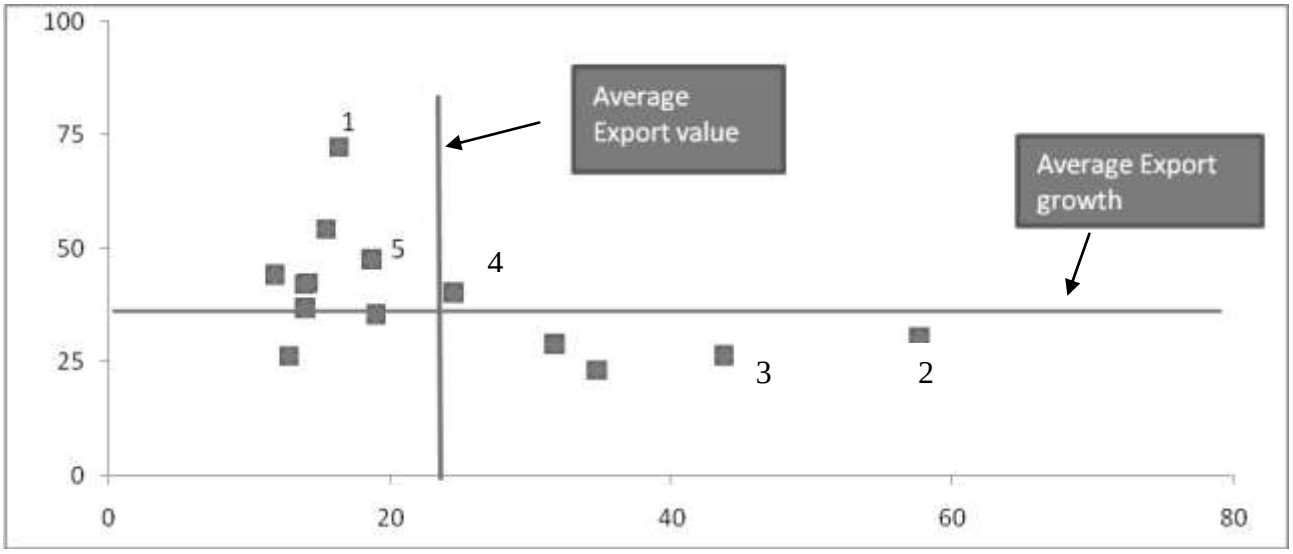

Fig. 2: India's Exports of Pharmaceuticals to African Countries

Note: 1*- Angola, 2*- Kenya, 3*- Ghana, 4* - Ethiopia, 5* - Benin

Average Export Value- 23.47, Average Export Growth- 39.29

India's exports to Africa have experienced a healthy growth in last 10 years. Major export destinations are Kenya, Ghana, Uganda, Tanzania, Ethiopia etc. India's Export experienced sharp growth in countries like Angola, Mozambique, Benin, Malawi, Algeria, Cameroon etc.

Following the methodology explained in earlier has divided the countries into 4 quadrants. Here in case of pharmaceuticals only Ethiopia comes in first quadrant (high export value and high export growth.), but interestingly many countries are in quadrant II. (Angola, Mozambique, Algeria, Benin etc.). Some of them are smaller economies but their growth potentiality cannot be ignored. India's Export to East African economies has large values but growth has slowed down. India needs to find new opportunities and renew its business relations with these countries with deeper interest.

The result of the CMS modeling is given in the Table 4 below. It is clear the rise in exports in all four short listed (based on data availability and results from Figure 2) countries are due to significant import demand in those countries and rising competitiveness of Indian exports. Benin and Ethiopia are two countries where India has gained competitiveness. However, it is important to note that India's product diversification effort is relatively less as depicted in the diagram.

Table 4: Analysis of Export Dynamics through CMS Modeling: Pharmaceuticals Products

India's Trade Partner	General increase in import demand	Diversification of India's Export composition	India's export competitiveness
Kenya	67.18	-4.67	37.48
Ghana	39.68	15.71	44.60
Ethiopia	42.91	11.84	45.24
Benin	25.80	9.20	65.0

Note: HS Code (4 digit) – 3001-3006, No of commodities- 6, Time period 2007-09

In case of pharmaceutical products, it can be seen from the table that effect of India export composition in exports to almost all the countries is very less. However the rise of exports can be attributed to the increase in import demand in the partner country and the rise in India's export competitiveness in these products.

Barriers in Pharmaceuticals exports:

There are number of barriers faced by the Indian companies while exporting pharmaceutical products to African countries. Some of them are as follows:

- African countries require huge generic drugs but port delay and custom valuation takes long time.
- Testing and certification requirements leads to reduction in exports as products can be rejected at ports and consequent costs of returning such consignments to country are huge
- Time taken for registering generic Pharmaceutical products in many African countries is very long. Also, regulatory approvals for a new generic product registration could take as long as 3 – 6 years
- Reach of Indian pharmaceutical companies to doctors, hospitals and distributors is limited

Towards cooperation with African countries in Pharmaceutical sector:

While developing a model of win-win situation between African nations and India, companies from India require access to the market and information about the right requirement from the government and private sector. Then only medicines can be offered at affordable price to the right place. In this context following strategic suggestion may prove useful.

- Indian companies require incentives to neutralise the cost of licensing and adhering to other regulatory requirement including approval process and marketing and distribution issues. Incentive structure for pharmaceutical companies may be linked with this issue.
- Market intelligence regarding changing regulatory framework required to be collected on regular basis to update exporters. Export council or government agency may be engaged for this, especially for African market.
- India may offer technical expertise in developing efficient system to reduce the systemic delay in Trade Facilitation. Department of Commerce may get engaged in discussion with its counterpart for smoothening of custom bottlenecks.
- Faster registration process will help African countries to access to affordable medicine. India can also offer expertise in developing new approval mechanism in target countries.
- Pharmaceuticals sector needs to be seen holistically which includes skilled medical professionals, nurses, technicians etc. Hence, government may engage in discussion with its counterparts in Africa for developing a health sector delivery mechanism through interlinking pharmaceutical sector with the health services.

5. (ii) Automobiles & its components:

With a growing population and improved economies in most African countries, demand and investment in the automobile industry is improving. The sector could grow faster, but it lacks the necessary technology to fully exploit its potential. Among African economies, South African auto manufacturers have shown great success and it is expected that some other markets can also be tapped for production and then to gain access to other African countries. To nurture the sector, Africa will need to have policies that promote the development of technology and skilled manpower, and meaningful investment in research and development. As a growing industry, the prospect in automobiles sector looks bright and provides attractive opportunities for investors. In many African markets, imported vehicles from emerging economies such as China, India are fast replacing the second hand Japanese made car market. Component industries are also growing at a fast pace. Because of the strong growth in middle class income group people and that of premium group segment, overall demand of automobiles, be that a car or a bike attained great heights. It has been speculated that Africa sells nearly 2.5 million bikes every year and that is the reason Indian firms are interested in African markets to a great extent. There is huge potential in these markets for automobiles and automotive parts business. African market offers the same opportunities for untapped growth that were available in China before it grew to its current status as the world's largest car market, and this is perhaps what attracts Chinese brands to the region[13].

India is one of the emerging nations which both have both huge production capacity and internal market. It is one of the fast moving developing nations which are considered as upcoming hub of production of automobiles and auto spare parts. Changes in the design

[13] Source: European Intelligence Unit

of models and use of technology have made Indian automobile industry compete in the global market. This sector has been growing exponentially over the last 5-7 years. Despite the down turn, the Indian automotive industry has been amongst the first few manufacturing sectors to recover. With the opening up of the sector, FDI is pouring in. Many foreign automobile giants also outsource critical components from India. During 2009, India exported vehicles to more than 40 countries. The new challenge in front of the industry is to manage the growth and develop a strategic foresight looking into evolving competitive paradigm of the industry globally. Considering its strength Indian industry can excel through product diversification, technology absorption and modification and exploring export opportunities in countries such as in Africa.

Table 5: Automobile Export Trends (No. of Vehicles)

Category	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Passenger Vehicles	1,66,402	1,75,572	1,98,452	2,18,401	3,35,729	4,46,145	4,53,479
Commercial Vehicles	29,940	40,600	49,537	58,994	42,625	45,009	76,297
Three Wheelers	66,795	76,881	1,43,896	1,41,225	1,48,066	1,73,214	2,69,967
Two Wheelers	3,66,407	5,13,169	6,19,644	8,19,713	10,04,174	11,40,058	15,39,590
Grand Total	6,29,544	8,06,222	10,11,529	12,38,333	15,30,594	18,04,426	23,39,333

Source: Automotive Component Manufacturers Association of India.

Table 5 provides a snapshot of Indian export of automobiles. Fast growth is visible in all segments in last few years. Major export markets for Indian automobiles in the African region are Nigeria, Egypt, Tanzania, Kenya and Sudan. In 2011-12, Maruti Suzuki India Limited shipped 17,247 cars to this North African country of Algeria, making it the Indian company's largest export market[14]. In terms of value in 2008, India's export to Africa was slightly less than US$ 1 billion but in 2011, the figure reached hopping US$2.45 billion. As mentioned earlier, along with traditional African markets several new markets experienced high import growth from India.

[14] Economic Times (21/5/2012) : Algeria , Maruti Suzuki is racing ahead in top gear

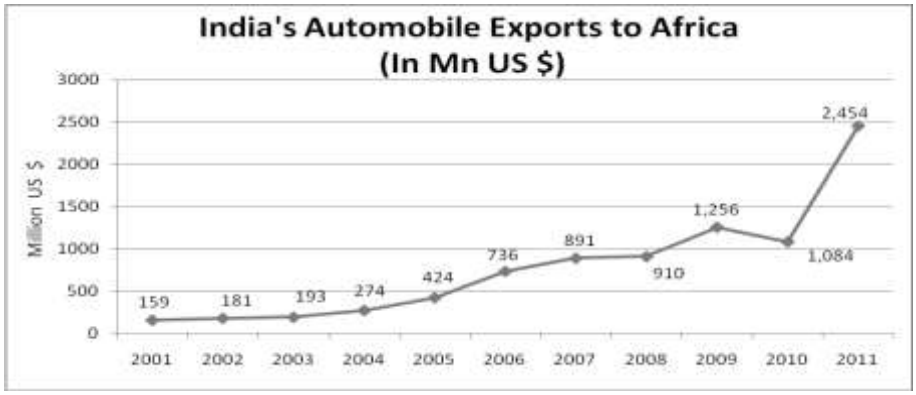

Fig.3: India's Automobile Exports to Africa (In Mn US $)

Source: India Trades, CMIE

Indian companies existence in Africa:

a) Tata Motors entered South African market in 2004 to open two production facilities to make small cars but its original intention was to take advantage of European Union's Free Trade Agreement (FTA). Tata motors would use this to assemble and export its cars to European markets as its competitors like Toyota, Volkswagen and Ford were already doing. With the growing demand of cars within the country itself, the company targeted both local and international market. The distribution and marketing of Tata cars in South Africa was handled by Accordian Investments Ltd., Joint Ventures between the Imperial Group, Ukhamba Holdings (Pty) Ltd. and Tata Africa.

b) Mahindra and Mahindra entered the African market as Mahindra SA into JV with Renault on the terms that it will be the first right hand driver automobile manufacturer of its low cost Logan car.

c) Maruti Suzuki Udyog Limited (MUL) took the advantage of right hand drivers in South African markets to start its business in African subcontinent and is setting up its plant there. Maruti sells its product in number of African nations and makes parts and components available there. Against the reconditioned Japanese cars, new Indian vehicles with the availability of parts have been found a good strategy in these countries.

d) In two wheeler market, Chinese companies give tough competition to India. Countries like Ethiopia, Algeria the potential gain for China is significant. Indian companies like Bajaj, TVS and Hero Motors Corp are aiming to set up assembly plants in Africa in the near future, but as of now they are catering to the growing demands through exports only.

Auto Ancillary Industry:

The spine of the automobile industry is its suppliers of auto components and accessories which is also an exclusive industrial segment. The total market size of the Indian auto components industry is estimated at over Rs 700 bn. The sector comprises 500 medium and large players, and also includes 5,000 units (Tier 2 & Tier 3) in the small scale

sector. There are 50 leading companies in the organised sector which account for a major share of the total output. The number of items produced exceeds 25,000. Having gained global recognition, the Indian auto components industry exports are growing at a rapid speed. The exports crossed the Rs 10 billion mark in 1996-97 and have progressively risen to a level of Rs 145 billion in 2007-08[15]. Globally speaking, the competitive edge of the Indian players is the low labour cost. The Indian prices are estimated broadly to be 10 to 25% less than the world market prices but are much higher when related to some specific items, where better material inputs and technology are involved.

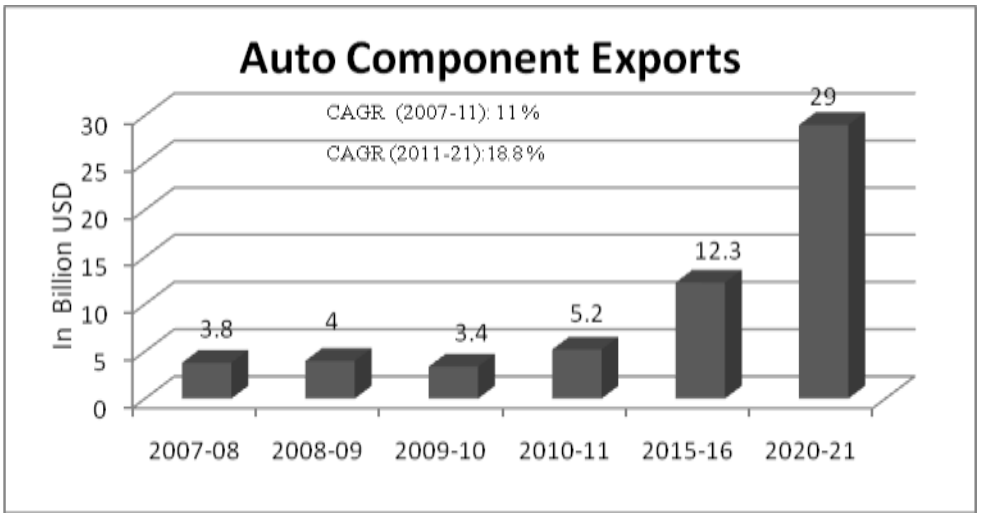

Fig.4: India's Auto component exports to world (Current and Projection)

Source: Automotive Component Manufacturers Association of India

Companies such as Delphi, Bosch, produce components in India both for domestic and export market. The auto component suppliers are now emerging as systems suppliers with capacity to design and develop critical parts. The large labour cost advantage translates into an overall cost advantage of 20-30% over the Japanese producers, despite lower labour productivity. Moreover, innovative capacity, good patent protection, capability of technology diffusion etc. provide a significant opportunity to Indian firms in becoming part of global value chain and also develop technology base in India. Major Indian auto component players such as Bharat Forge, Amtek Auto, Sona Group are now actively exporting to global giants.

The rapid industrialization and modernization currently sweeping through many African countries has resulted in an increased demand for capital goods such as machinery, lubricants, spare parts, ball bearings and other mechanical goods and accessories. Competition heats up as manufacturers of auto components engage in battle to gain market supremacy in Africa. Taking the case of tyres, the African continent is one of the fastest growing markets for the global tyre industry. The rapid growth of the middle

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class in many African countries has pushed demand for automobiles to an all-time high – in turn creating a growing market for all kinds of tyres: passenger car tyres, off-the-road tyres, industrial tyres, agricultural tyres, truck, bus and trailer tyres as well as motorcycle and bicycle tyres. Competition is fierce among traditional European players with Chinese and other Asian players. India is also seeking market entry vigorously in many of the African countries. Same is the case for many other accessories.

Nigeria, Egypt, Tanzania, Kenya, etc are major markets of India. However, several new markets experienced significant high growth in recent times such as Algeria, Togo, Cameroon, Ghana, etc. To shortlist the countries as described in methodology section, we have compared mean export value and mean export growth of Indian exports in major African markets. The details are given in Table 6. The values are plotted against 'Africa Average' in Figure 5 to observe which countries are falling in which quadrants. This is important to observe that no country is falling into quadrant 1. This clearly indicates that our export market in Africa is clearly divided into two groups: One with high value but relatively low growth and other high growth but small in terms of market size. Hence, India requires to strategize African market considering this unique phenomenon. Big markets are important and India needs to diversify its product basket persistently in these markets to keep the current growth buoyant. In smaller economies, India needs to continuously test the market focusing into nature of local demand so that it remains ahead of other competitors.

Table 6: India's Exports of Automobile and its components to African countries

Importers	Mean Export Value (2001-11)	Mean Export Growth (2001-11)
Nigeria	86.44	38.50
Egypt	73.31	32.01
Tanzania	28.42	34.95
Kenya	32.12	25.80
Sudan	28.26	36.05
Uganda	18.98	25.45
Ghana	21.51	70.99
Morocco	17.79	38.55
Mozambique	13.15	31.92

Contd. Table 6: India's Exports of Automobile and its components to African countries

Importers	Mean Export Value (2001-11)	Mean Export Growth (2001-11)
Cameroon	2.31	50.95
Guinea	6.20	84.95
Seychelles	2.30	33.82
Togo	3.78	85.70
Namibia	3.79	24.77
Average	**24.17**	**43.89**

Source: India Trades, CMIE

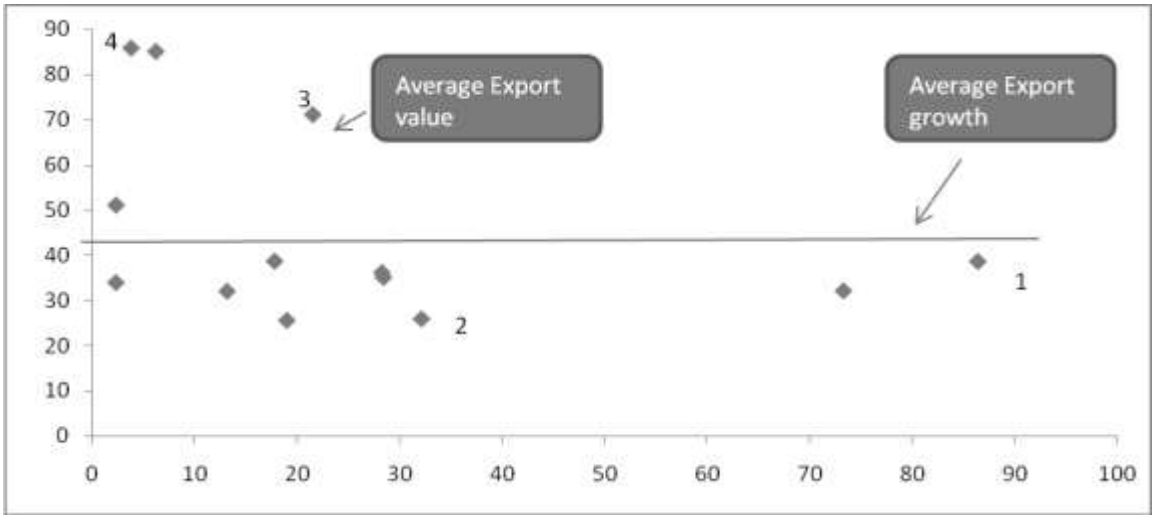

Fig. 5: India's Exports of Automobile and its components

1* - Nigeria, 2* - Kenya, 3* - Ghana, 4* - Togo

Average Export Value- 24.17, Average Export Growth- 43.89

For CMS analysis we have identified four countries from the above diagram. Nigeria and Kenya are big markets with high value while Ghana and Togo are relatively smaller markets. There has been a data availability problem for some relevant countries and hence, we ignored them. For example, latest data of Egypt is not available. The result of

CMS modeling is given in the Table 7 below. It shows that except Togo (which is a new market) India has gained substantially in terms of competitiveness. In Nigeria, Togo and Ghana, internal demand growth is impressive which also attracts Indian vehicles to be sold there. However, in Kenya, product diversification in the export basket plays important role. Hence, in Nigeria, Indian players need to offer more varied option which can help them to sail through where is in Kenya more focus should be on after sales service, distribution channel, innovative pricing, etc to push Indian products further as internal demand growth has slowed down in last few years. In Ghana, companies must explore product diversification option while in Togo, pricing, trade barriers etc should be looked into to improve competitiveness.

Table 7: Analysis of Export Dynamics through CMS Modeling: Automobile Sector

India's Trade Partner	General increase in import demand	Diversification of India's Export composition	India's export competitiveness
Nigeria	117.44	-81.31	63.87
Kenya	-1.02	51.74	49.28
Ghana	31.18	-1.18	69.21
Togo	71.14	56.87	-28.02

Note: HS Code (4 digit) – 8701-8716, No of commodities-16, Time period 2007-09

Barriers in case of automobile exports:

- Excessive documentation requirements for the purpose of customs clearance in Africa. Port delay and custom valuation procedures are stringent. Opportunity is there to negotiate tariff with some countries also.
- Luxury tax for car with bigger engine is high in some countries. If India plans to export SUV, this requires to be negotiated.
- High Non tariff barriers exist in most of the African nations. For eg. Passenger vehicles may only be imported into Egypt within 12 months of the year of production. Government to government discussion may be encouraged to facilitate Indian exports further.
- High tariff rates are applied on some components. Other duties are also prevalent. For example, in Nigeria, National automotive council levy of 20% are charged on automotive product.
- Technology collaboration, R&D centre development after sale service etc. requires attention. Setting up business is costly.

5.(iii) Mechanical Machinery:

To improve productive efficiency levels and types of improved mechanical technologies need to be appropriate, that is, compatible with local, socio-economic, environmental and industrial conditions. In the last 50 years, few economies have been able to overcome the challenges of development and become truly competitive. In those few cases, there are concrete indications that industrial development has played a key role. Many African economies though experienced higher growth in recent times, in terms of development of indigenous machinery industry they are still struggling. This may be due to host of factors be they socio-economic, technological or political. Since the turn of the century, many African nations have taken up bold steps to improve the economic conditions necessary for industrial development. Africa's institutional, industrial, financial knowledge and capacities have improved significantly in last one decade. Earlier machinery market in Africa was fragmented and relied heavily on unpredictable and unsuitable tools. With the formulation of national industrial strategies new business opportunities have opened in setting up factories to produce machines tools. Hence, the demand for higher value added machines and capital goods have gone up. At the same time, demand for basic tools have shifted to poorer African countries who are few stages behind other nations and now getting ready for indigenous industrial development.

Among European and North American machinery manufacturers traditionally responsible for supplying equipment to Africa, two problems have reduced their interest in the continent. The machines they produce are for Western large-scale and capital-intensive product markets, and these are increasingly sophisticated, large and expensive. The technology required for older type machines are no more available in most of the developed economies and hence they can't export them to Africa any more. Neither the industrial development in African countries are that encouraging (especially in terms of achieving economies of scale) that a developed country entrepreneur finds enough incentive to set up production unit in Africa with older technology. On the other hand, emerging economies, especially in Asia, are producing machines more suited to Africa in terms of both specification and price. Asian manufacturers are also adopting marketing and technical support practices for African economies.

Mechanical engineering industry in India is showing rapid advancements in every sphere of the economy with Indian companies forging ahead in making of defence equipments, aircrafts, sleekly designed cars, vehicles and various industrial devices. Indian mechanical engineering are continuously gaining experience in many countries which have helped them to change their business model fast and adapt scenarios best suitable for developing nations. India's engineering exports are likely to cross the USD 50 billion mark by the end of this fiscal on the back of increasing demand in markets like North America, Africa and Middle East countries. India is a major exporter of light and heavy engineering goods and has a well-developed and diversified industrial machinery and capital base. Engineering Export Promotion Council (EEPC) along with the government are making constant effort in terms of buyer seller meet, organising trade fairs, providing useful advices etc. Experts attribute the rise to the significant competitive

edge the Indian companies have acquired in the engineering space and their ability to rise up the value chain. They attribute the rise to low labour costs combined with requisite skill sets which India enjoys, thanks to the continued increase in engineering graduates. The government's incentives to exports to non-traditional markets have helped Indian companies. The share of Europe and the US is down nearly 15 percentage points over the decade. The share of Russian Federation, Middle East and Africa is up to 13.5% from 5% a decade back. The engineering goods have moved from the low to the medium end in terms of skill, knowledge and R&D applied. Emerging markets in general are more cost competitive. This has helped these markets in attaining high growth in exports. Figure 6 shows the export of Indian mechanical machinery to Africa. Though during 2005-2009, export growth higher, it has slowed down in last two years. In 2005, India's export to Africa was US $ 419 million and it stands at US$ 1.17 billion in 2011. The traditional African markets for Indian goods are Equatorial Guinea, Ethiopia, Gambia, Ghana, etc. There are few new markets in which Indian goods experienced high growth are Malawi, Mali, Morocco, Mozambique, etc.

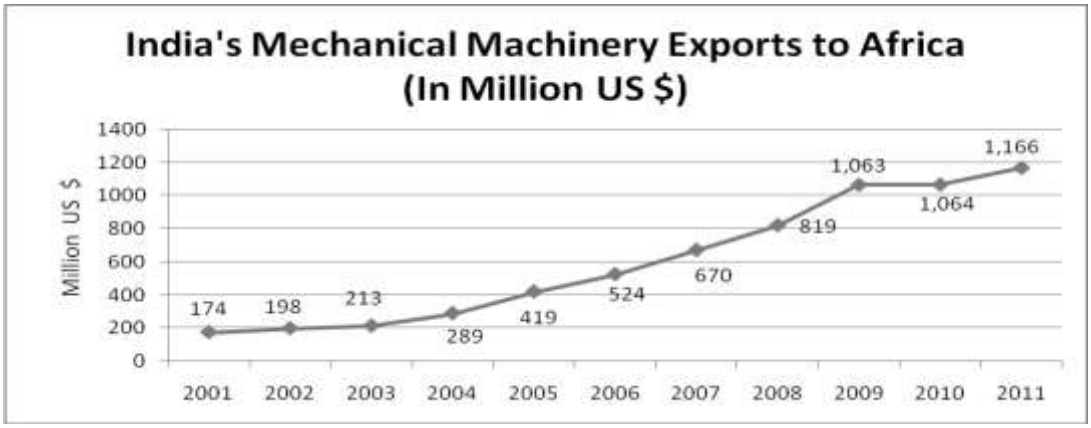

Fig. 6: India's Mechanical Machinery exports to Africa

Source: India Trades, CMIE

Following the same methodology as done for other products, countries are shortlisted comparing mean export value and mean export growth of Indian exports to major African markets. The details are given in Table 8. The values are also plotted against 'Africa Average' in Figure 6 to observe which countries are falling in which quadrants.

Table 8: India's Exports of Mechanical Machinery to African countries

Importer	Mean Export Value(2001-11)	Mean Export Growth(2001-11)
Equatorial Guinea	60.97	24.39
Ethiopia	55.23	33.33
Gabon	33.85	29.85
Gambia	25.27	87.11
Ghana	22.71	20.69
Guinea	16.17	43.27
Kenya	14.96	29.52
Liberia	13.15	35.54
Malawi	8.37	68.81
Mali	6.97	62.65
Mauritania	4.09	40.27
Morocco	3.91	58.48
Mozambique	3.52	66.25
Average	**20.71**	**46.17**

Source: India Trades, CMIE

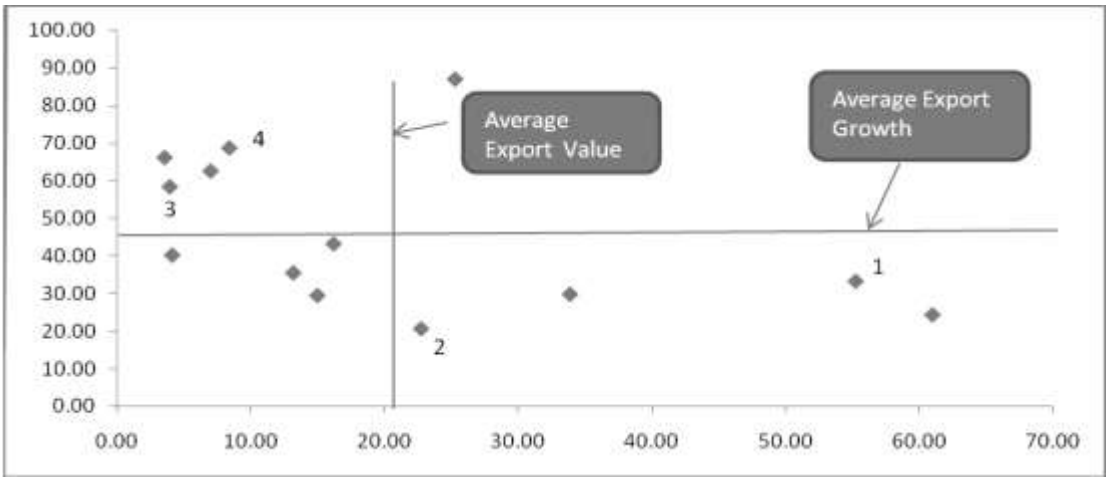

Fig. 7: India's Exports of Mechanical Machinery to African Countries

1* - Ethiopia, 2* - Ghana 3* - Morocco, 4*- Malawi

Average Export Value- 20.71, Average Export Growth- 46.17

As in case of automobile sector, no country has fallen in first quadrant except Gambia. Most of the countries either in second or fourth quadrant implying that export growth is smaller than average rate of growth where market is bigger while growth is higher where market is relatively smaller. We have identified four countries from the above diagram for CMS analysis. We have left some other relevant countries due to paucity of latest data. Ethiopia and Ghana are relatively bigger markets. Ethiopian market is driven by high demand and product diversification. However, India has not gained in terms of competitiveness. Hence, it is important to look into the issues which inhibit India there to achieve better competitiveness. It could be trade barrier, lack of brand building etc. In other words more study is required to look into macro and micro issue to enhance competitiveness. On the other hand in Ghana, India has gained fairly in terms of competitiveness but down with low product diversification. Exporters need to explore the possibility of selling different types of machineries in this market. Relatively new market say in Malawi, high demand is pulling Indian product. Perhaps, Indian exporters are now at the early stage to explore the market and establish them there slowly. So far in Morocco Indian exports are very concentrated only in few products but it has achieved high competitiveness by this time. Hence, exporters must concentrate on further diversification of the export basket.

Table 9: Analysis of Export Dynamics through CMS Modeling: Mechanical Machinery

India's Trade Partner	General increase in import demand	Diversification of India's Export composition	India's export competitiveness
Ethiopia	75.65	169.65	-145.31
Ghana	44.6	13.5	41.9
Morocco	42.99	-16.92	73.92
Malawi	112.78	7.33	-20.12

Note: HS Code (4 digit) – 8401-8485, No of commodities- 85, Time period 2007-09

Barriers in case of mechanical machinery exports:

Africa is not an easy place to do business. International companies complain of high levels of bureaucracy and corruption. The World Bank's Ease of Doing Business survey ranks most African countries quite poorly. However, many entrepreneurs often see an opportunity where others see hurdles.

- There is a good growth opportunity but product focus is lacking. Frequent changing of customs rules are not known to exporters beforehand.
- Transparency in Technical Barriers to Trade (TBT) is an issue. This may directly related to India's competitiveness. Many a times African land up buying costly machinery which may not be the exact requirement due to variety of regulatory issues.
- Delay at the port for checking standards and to receive validation certificates. Some tariff peaks are there which are also affecting. The machinery sector consists of large number of products and hence there is a possibility of tariff peaks with relatively low average tariffs.

Government of India requires to use the trade policy tools such as 'Focus country' or 'Focus Product' scheme to enhance machinery exports to Africa. While doing so, government can start discussion with its counterpart about TBT issues which are quite common in this sector.

5. (iv) Iron and steel and Products thereof:

Iron is the fourth most abundant element and makes up more than five percent of the earth's crust. Steel is an alloy of iron and carbon containing less than 2 percent of carbon with smaller amounts of other elements such as manganese, silicon, phosphorus,

sulphur and oxygen. The basic processes in production of steel are classified in to rolled products, forged products and cast products. The mass production of cheap steel has revolutionized our world.

The Iron and Steel Industry in Africa is in virtual dormancy, except for South Africa. This is in spite of the fact that it is the basic foundation for industrial development of any country. Africa has 30% of the world's mineral resources, which include all the raw materials required for the steel industry, which raises the prospects for the steel industry in the region. Africa produced 17.898 million tonnes in 2005 representing 1.6% of world production. In countries like Nigeria and Zimbabwe substantial investment has been put. These two countries could pride themselves for having acquired the sophisticated technologies for steel making in their integrated steel plants. Steel industry in Nigeria has faced some problem due to premature privatization. Recently ambitious project has been taken up by Ajaokuta Steel Company. On the other hand, Zimbabwean ZISCO, though operating for sometime after its resuscitation, has been recording losses and therefore needs to be turned around.

India on the other hand gave substantial focus on steel industry. At the time of independence in 1947, India had only three steel plants – the Tata Iron & Steel Company, the Indian Iron and Steel Company and Visveswaraya Iron & Steel Ltd. The period till 1947 thus witnessed a small but viable steel industry in the country, which operated with a capacity of about 1 million tonne and was completely in the private sector. From the fledgling one million tonne capacity status at the time of independence, India has now risen to be the 4th largest crude steel producer in the world and the largest producer of sponge iron. From a negligible global presence, the Indian steel industry is now globally acknowledged for its product quality. It is important to note that the initial growth of steel industry in post independence period was driven by public sector investment started during the second five year plan. India has one of the richest reserves of all the raw materials required for the industry, namely land, capital, cheap labour, iron ore, power, coal etc. It has produced 66.8 million tonnes in 2010-11, while China, at the top of the list, produced 626.7 million tonnes. The National Steel Policy – 2005 aims at increasing the total steel production of the country to 110 million tonnes per year (in 2019-20) from 38 million tonnes (in 2004-05). India exports iron and steel in the form of metal as well as value added products. Its export has started increasing since the middle of last decade. More precisely, India's export to Africa showed spectacular growth in last one decade. This coincided with the higher economic growth in Africa. In 2003, India's export was only US$ 130 million and it is now close to US$ 1 billion.

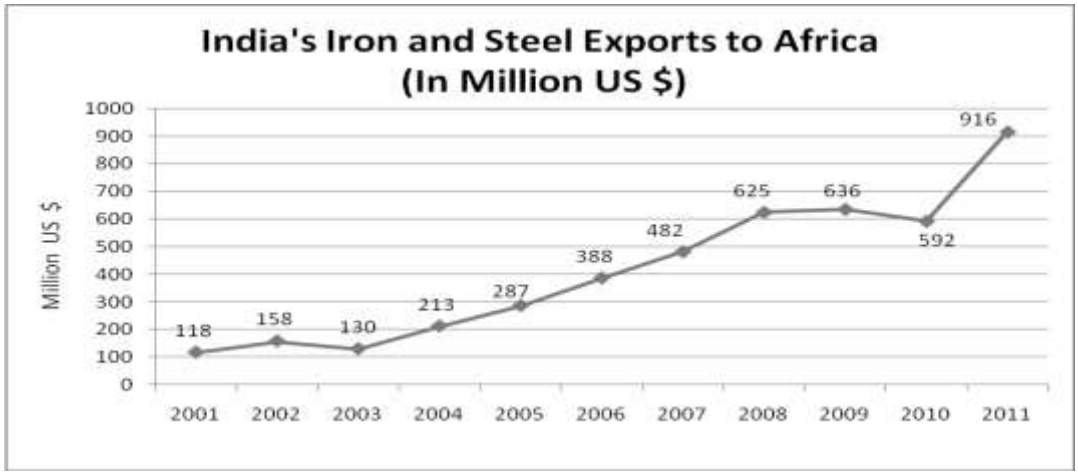

Fig. 8: India's Iron and Steel Exports to Africa

Source: India Trades, CMIE

Let us now shortlist countries following the same methodology as done for other products. Country wise mean export value and mean export growth of Indian exports to major African markets have been compared and put in Table 10. The values are also plotted against 'Africa Average' in Figure 9 to observe which countries are falling in which quadrants. This is important to note that like automobile sector no country falls in quadrant 1. Most countries are in quadrant 2 and 4. Existence of several countries in quadrant 4 implies that India exports iron and steel products to few large markets. However, some new markets are also emerging as they have experienced extraordinary high growth.

Table 10: India's Exports of Iron and steel to African Countries

Importers	Mean Export Value (2001-2011)	Mean Export Growth (2001-2011)
South Africa	28.14	26.87
Benin	27.70	35.22
Kenya	17.20	25.69
Ghana	15.75	30.14
Tanzania	9.47	37.44
Togo	5.17	47.64

Contd.Table 10: India's Exports of Iron and steel to African Countries

Importers	Mean Export Value (2001-2011)	Mean Export Growth (2001-2011)
Mozambique	4.95	54.56
Congo P. Republic	4.79	67.27
Uganda	3.89	25.56
Zambia	2.85	81.93
Cameroon	1.53	35.67
Burkina Faso	1.38	59.24
Reunion	1.13	74.32
Average	**9.53**	**46.27**

Source: India Trades, CMIE

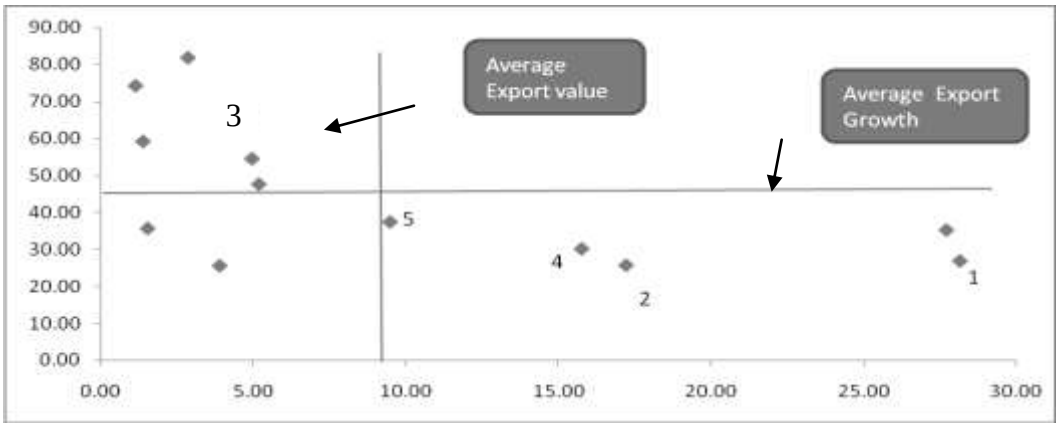

Fig. 9: India's Exports of Iron and steel to African Countries

1* - South Africa, 2* - Kenya, 3* Congo P. Republic, 4 * -Ghana, 5*- Tanzania

Average Export Value- 9.53, Average Export Growth- 46.27

India's Major export destinations are South Africa, Benin, Ghana and Kenya. Considering the data availability we have considered total four countries for CMS analysis. Some

relevant countries such as Mozambique, Zambia and Burkina Faso etc are excluded as latest disaggregated data are not available. In South Africa and Kenya, product basket is very concentrated and India is mostly sending raw metal without much value addition there where as Congo market is solely driven by product diversification. Competitiveness of Indian exports has been significantly responsible in export growth in Kenya, Ghana and South Africa.

Table 11: Analysis of Export Dynamics through CMS Modeling: Iron and Steel Products

India's Trade Partner	General increase in import demand	Diversification of India's Export composition	India's export competitiveness
South Africa	68.22	-14.92	46.69
Kenya	-10.91	-1.79	112.70
Congo P. Republic	-59.95	151.72	8.22
Ghana	64.66	31.11	66.44

Note: HS Code (4 digit) – 7201-7229, No of commodities-29, Time period 2007-09

Barriers in case of iron and steel exports:

- High tariff rates are applied on some products.
- High tariff dispersion is there leading to misclassification and tax evasion

6. Conclusion:

The current paper analysis India's Export Opportunity in Africa for some selected sectors such as Pharmaceuticals, Automobile including auto components, Mechanical machinery and Iron and Steel products. A simple methodology is adopted to shortlist the countries in terms of export volume and export growth. Few countries have been selected from these countries to investigate further the reason of export growth.

In case of Pharmaceuticals products, we have identified countries like Angola, Mozambique, Algeria, Ethiopia; Benin etc. can be considered for good opportunity in near future. India's exports to East-African countries are slowing down and, hence, it needs to renew its strategy for this country. Major regulatory issues such as testing, certification and overall drug approval process may be discussed with the Government of

those countries. In many cases, the reach of India Pharmaceuticals companies to Doctors, hospitals and distributors in African countries is limited. Hence, India may negotiate for a holistic approach in health delivery system which includes setting up hospital, allowing Indian Doctors and nurse and technician for selected countries. Indian exports show less product diversification. So far the growth is mainly driven by increase in domestic demand and competitiveness. Hence, Indian exporters must think of expanding their product profiles to have a long run stability in the export growth.

In case of Automobile and Auto components Industries, India has enjoyed a sharp export growth in last few years. Countries such as Ghana, Cameroon, and Guinea are the countries where new opportunity exists. Traditionally, India's export go to countries like Nigeria, Egypt, Kenya, Tanzania, Sudan etc. in which also growth is though less than the other countries but still have a healthy figure. As demand for old reconditioned Japanese cars are coming down, India must take the opportunity and fill the market with variety of Indian brands. For this companies must consider developing after sales service, distribution channel, innovative pricing, etc. They must also make parts and accessories available in the market which will help them to get better buoyancy in the market. Indian government requires to discuss several issues such as luxury tax, technology collaboration, port delay and high tariff rates in some of these countries.

In case of Mechanical Machinery, India's exports to African Countries have crossed US$ 1 billion in 2009 but growth has slowed down since then. India is already trying to boost the export through organizing trade fairs and business to business meeting among the partners in the industries. Our analysis shows that India's export destinations in African can be divided into two groups: countries where export value is high but growth is slowing down and countries where market is smaller but experiencing high growth. Ethiopia, Ghana etc are bigger markets. High growth is observed in countries like Mozambique, Malawi, Gambia etc. India needs to focus on the Oil Exporting African Countries because the machinery industry is fast developing there and India can be a very important source of import. India's export basket lacks focus and it is very concentrated. Machinery sector accounts for large number of products. Indian exporters need to explore the possibility selling diversified goods. Technical barriers to trade, licensing and port delay are the major bottlenecks which government may start having discussion with its counterparts in Africa.

Similarly, In case of Iron and Steel also, India needs to focus on oil exporting as well as relatively developed economies such as South Africa etc. In case of iron and steel high growth is observed in Zambia, Mozambique, Burkina Faso. However the export value is currently negligible, hence, India requires to seek market access in these countries aggressively. Both in case of machinery and iron and steel products , focus country and focus products scheme may be used intelligently to improve India's competitiveness there.

Generally, India faces common problems in most African Countries such as port delay, custom revaluation, Indian transparency as well as frequent change on Government policy. African Countries require capacity development in developing good SPS and TBT standards in which India can provide assistance. As it is already projected that African

economies will pick up its growth in next five years and will sustain a high growth shown for next 20 years. India must make itself ready for taking the advantage of the opportunity. The study provides the analysis that the export growth in selected sectors is not because of competitiveness only. The African growth itself pulls up the import demand and India is a beneficiary of that. However, considering competition from China and other developing economies, India must take focused approach in improving competitiveness considering both macro (trade issues) and micro (firm specific) aspect at the one hand and diversify product basket on the other as exports are currently concentrated only to limited number goods and thereby increases long run risk.

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APPENDIX:

Constant Share Model:

$$X(t) - X(0) = mX(0) + \Sigma\{(m_i - m) X_i(0)\} + \Sigma\{X_i(t) - X_i(0) - m_i X_i(0)\} \quad \ldots\ldots\ldots(1)$$

where

X: exports of country A to country B

X_i: commodity i exports of country A to country B

m: Percentage increase in country B's total imports from period 0 to period t

m_i: Percentage increase in country B's imports of commodity i between period 0 to period t

and $X=\sum X_i$

The right hand side can be divided into three components

(a) The general rise in country B's total imports

(b) The commodity composition of country A's exports to B in period 0, and

(c) An unexplained residual indicating the difference between country A's actual exports increase to country B and the hypothetical increase if country A maintained its share of exports of each commodity group in country B.

Let us assume,

$Mi(t)$ = country B's imports of commodity i in period

ΔMi = the change of Mi between period 0 and t

In that case, for a particular commodity, the (c) part can be written through growth in B's import from A, or in other words,

$$Xi(t) - Xi(0) - miXi(0) = Xi(t) - Xi(0)\left\{1 + \frac{\Delta Mi}{Mi(0)}\right\} \quad \ldots\ldots\ldots\ldots(2)$$

$$= Xi(t) - Xi(0)\left(\frac{Mi(t)}{Mi(0)}\right)$$

Dividing the above term by Mi(t), we get

$$\left(\frac{Xi(t)}{Mi(t)} - \frac{Xi(0)}{Mi(0)}\right) \quad \ldots\ldots\ldots\ldots\ldots(3)$$

= [A's share of product i in B's market at time t] - [A's share of product i in B's market at time 0]

Demand for imports in a given market (country B) from two competing sources of supply (country A and the rest of the world) is described by the following relationship-

$$\frac{Xi}{WXi} = f\left(\frac{Pi}{WPi}\right) \qquad \text{.....(4)}$$

where Pi = the export price of commodity i to country B

WXi = the rest of the world's export of commodity i to country B

WPi = the export price of commodity i from the rest of the world to country B

The expression (4) can be altered by multiplying P_i/WP_i

$$\left(\frac{Pi}{WPi}\right)\left(\frac{Xi}{WXi}\right) = \frac{Pi}{WPi} f\left(\frac{Pi}{WPi}\right) = g\left(\frac{Pi}{WPi}\right) \qquad \text{.....(5)}$$

The expression (5) implies a relative demand function of export from A in B's market in terms of B's import from the rest of the world.

In other words, it may be stated that for any product i, country A's share in country B will remain constant except as $\frac{Pi}{WPi}$ varies.

So,

$$\frac{Xi(t)}{Mi(t)} - \frac{Xi(0)}{Mi(0)} = g\left(\frac{Pi(t)}{WPi(t)}\right) - g\left(\frac{Pi(0)}{WPi(0)}\right)$$

Now we shall consider the residual term (c) again. It may be expressed as-

$$\sum\{Xi(t) - Xi(0) - miXi(0)\}$$

$$= \sum Mi(t)\left(\frac{Xi(t)}{Mi(t)} - \frac{Xi(0)}{Mi(0)}\right)$$

$$= \sum Mi(t)\left\{g\left(\frac{Pi(t)}{WPi(t)}\right) - g\left(\frac{Pi(0)}{WPi(0)}\right)\right\} \qquad \text{..... (6)}$$

The expression (6) provides the overall effect of competitiveness measured through changes in relative prices and thus the term (c) may be called the 'competitive effect'. Through it is a residual term we have identified the residual term as a function of relative price. Change in competitiveness here is defined through the change in relative prices. If a country fails to maintain its market share in a given market, the competitiveness term will be negative. This indicates that the relative price increase for that country is greater than its competitors.

List of working papers of IIFT

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