Advancing Value Addition and Competitiveness through Standardization to Promote Manufacturing

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Abstract

The Manufacturing Sector is one of the main sectors in the Uganda economy and it is divided into formal and informal manufacturing. The total contribution of the manufacturing sector to GDP was 8.4 percent in 2006. (Business Register Report 2006/07-UBOS). Overall there was an increase of 32% of the manufacturing businesses in 2006/07 compared to 2001/02 in Uganda. Manufacturing is the process of taking resources and through packaging, processing, fabrication and/or assembly transforming the resources to a physical product demanded in the market place.

The businesses in this sector include those engaged in the following activities: Processing of meat, fish and dairy products; coffee processing; grain milling; tea processing; bakery and manufacture of other food products; manufacture of beverages & tobacco; manufacture of textiles and leather products; sawmilling, printing & publishing; chemicals and chemical products; manufacture of plastics; manufacture of metal products; and manufacture of furniture.

A thriving manufacturing sector is vital to the developing economies and their citizens as manufacturing businesses generate jobs, hence incomes to support service industries and public services. However, the sector is faced with changing challenges, and advancing value addition and competitiveness through standardization will respond to the sector's value and opportunities, which will promote high performance practices, Science, Technology and Innovation, as well as building the skills of the manufacturing workforce.

Manufacturers in Uganda like their counterparts in the region face stiff global competition and must continually improve their products and processes to stay competitive. Their success will depend on continuously integrating new technologies and innovations, adding increasing value to products, reducing waste to processes and having access to resources such as capital, raw materials and most importantly a high skilled, flexible and involved workforce. (Supply chain).

To maintain the growth of the manufacturing sector, both the public and private sectors need to respond by creating new high performance work environments (infrastructure development) and providing flexible, responsive education and job training programs that are competency-based, responsive to the demands in a rapidly changing labour market and are tied to new technologies, customer needs, and evolving production processes.

From the commonly available indicators and factors of competitiveness in comparative framework, it is evident that most African business environments still have serious short comings compared with their international competitors. This paper will discuss factors needed to improve productivity, value addition and competitiveness for the African and the global markets. To achieve manufacturing that meets customer specifications and delivery dates (value addition and

competitiveness), the paper suggests broad benchmarks and initiatives that are linked with the solution of problems.

Keywords: Clustering; Competitiveness; Innovation; Manufacturing, Value addition

1. INTRODUCTION

Since the industrial revolution, manufacturing has helped define economic development. Manufacturing is the process of taking resources and through packaging, processing, fabrication and/or assembly transforming the resources to a physical product demanded in the marketplace. In developing nations, manufacturing has consisted primarily of processing raw resources into semi-processed goods. These goods are then further processed into products. The additional processing usually takes place in areas close to the marketplace resulting in a clustering of the required technology, capital, services, management and workforce. Over time this centralization of value added production made regions and cities with large urban populations strong in manufacturing development while developing nations remained dependent on primary resource production.

Manufacturing has been, and remains, the main engine of structural transformation. While its contribution to GDP in most countries reaches a peak at 30-40 percent and then declines as modern services grow, its contribution to development is much more significant. It is this contribution that Africa has failed to tap. Manufacturing is critical to changing and modernizing Africa's economic structure. It is the main avenue for applying new technologies to production and for raising technical and managerial capabilities. It is crucial to raising and diversifying exports, moving the region from its continued dependence on low value-added and unstable primary products. It is necessary to create new skills, work attitudes and institutions. And it can be the driver of growth and productivity in other activities: agriculture, information-based services, finance, construction, logistics and so on.

The manufacturing sector in Uganda is still very young, small and dependent on imported goods. It is characterized mainly by processing of agricultural raw material and production of basic consumer goods. Around 40 percent of all manufacturing firms are engaged in agro-industries, only very few are operating in capital goods industries often with rather low value added, the rest are in industries such as plastics, steel and construction products (Mugisa 2004, 24-5). The sector is preliminary concentrated on small manufacturing, production for the domestic market and by little standardization of products, thus being affected by specific market characteristics such as small market size, high level of smuggling, and insecurity in the North. A few have successfully penetrated regional (Rwanda, Burundi, eastern Congo) markets, or global (EU, USA) markets. Those engaged in for instance neighboring markets are generally well aware of regional competitive factors and gradually seek to enhance their competitive position. The recent opening of business opportunities in southern Sudan has resulted in a fairly active and strategic response.

Manufacturing has undergone significant change in an era of global competition, new information and production technologies and corporate re-structuring for economic use of resources. For governments, industry associations and community development organizations seeking to foster manufacturing sector development, a key lesson is the ability to take a coordinated and sustained approach to necessary conditions which will greatly increase the chances of success in expanding the sector in order to stay competitive or improve competitiveness in the global markets.(Dr. Aleef Suleman-2005)

Competitiveness in this case means the ability of enterprises to take advantage of the opportunities offered by globalization trends. Society has changed from a closed market and a closed manufacturing place to an open one. It is no longer necessary to have centralized manufacturing facilities. Functions could be distributed. Designs could be done in France, manufacturing done in Mexico, Malaysia or some other country where the costs possibly could be kept low; production planning could be done in USA, marketing strategies evolved in Hong Kong and service parts produced in China or South Africa. Such a globalization leads to a cross cultural dialogue between regional blocks, governments, corporations, societies and most importantly individuals. Manufacturing researchers have concentrated on manufacturing processes, materials and methods. Though these are still extremely important, it is becoming increasingly apparent that we also need to focus on the additional dynamics which is a result of globalization and information explosion.

We need to be aware of the procurement, production and distribution along with the feedback as the main components of manufacturing lifecycle in this globalization process and in order to accomplish this, it is necessary to be aware of the current technologies which includes required standards. (Standardization is the process of developing and agreeing upon technical standards. A standard is a document that establishes uniform engineering or technical specifications, criteria, methods, processes, or practices)

Globalization has shifted the paradigm for manufacturing. The customer is involved with the manufacturing of the product. The most important characteristics of manufacturing due to globalization are:

- Customers involved with the production of the part from cradle to grave (from design to usage: life cycle)
- Customers have access to data instantly
- Customers have access to different manufacturers
- Experts need to cooperate and collaborate with the customers
- Customers will get what they have requested.

The basis for Uganda's future prosperity and its ability to invest in the improvements desired will depend on the competitiveness of its existing and future industries. Competitiveness is not defined as the ability of the country to compete on the basis of its raw materials, cost of labor or other domestic resource costs. Rather, it is based on the ability to strategically position the industries in attractive markets and with attractive products; and this can only be done by advancing value addition, promote high performance and governing practices, Science,

Technology and Innovation, as well as building the skills of the manufacturing workforce. An example is Mozal Project Scheme in Maputo -Mozambique (Masaki Miyaji, 2007)

Mozal S.A.R.L		Mozal Phase 1	Mozal Phase 2
©	Business	Aluminium Ingot Smelter	
©	Location	Maputo/Mozambi que	
©	Construction start	May 1998	June 2001
®	Operation start	June 2000	April 2003
©	Production Capacity	280,000 tons	280,000 tons
©	Shareholders & Equity		
	Mitsubishi Corp	25 %	
	BHP Billiton	47 %	
	IDC	24%	
	Mozambican Govt	4%	
©	Total Cost	US$1,200 Mil	US$710 Mil
®	Employee	1,135 (as of Aug 2006)	
©	Reduction Technology	AP35 (Pechiney Technology) ---Upgraded in 2006 from AP30	
®	Electricity Supply	Supplied from South Africa	
®	Alumina Supply	Supplied from Australia	
©	Aluminium Ingot Offtake	Pro-rata basis	

Key Drivers for Investment:

The private sector will have to adopt a more competitive approach, focusing on higher value products and services, where value is added because of better market linkages, as the main outputs. The classic industrial engineering definition of Value Added is, "actions or activities that change the form, the fit, the function of the product being manufactured and, this is important, the changes are something the customer is willing to pay to have happen."

In addition, Productivity, which is simply defined as the value per unit of input, the better use of human, capital, and natural resources will all be increasingly the determining factors for Uganda's success and the region as well. Individual firms cannot become competitive and stay competitive in the global market on their own; building competitiveness involves sustained change throughout the value chain: This close interplay between firms, their suppliers and the business environment is why competitiveness theorists and practitioners focus on "clusters" as the locus of action.

Clusters are "geographical concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field" (Porter, 1998) .Associated institutions might include: educational and training institutions that build the workforce; research institutions that generate scientific knowledge for technological change; banking and financial institutions; government institutions, whose policies and practices have an impact on the industry

including standards developers and regulators (National Bureaus of Standards or Commissions of Standards); and providers of infrastructure, both public and private.

The ability of African countries to develop competitive manufacturing sectors will therefore depend on the quality of African business environments, and labor forces relative to those of the export powerhouses of the developing world. Thus, to advance manufacturing competitiveness, numerous major bottlenecks need to be addressed that will focus on manufacturing modernization, including policy uncertainty, poor access to finance, insufficient energy supply, slow technology transfer, focused training and general business support with governance as a cross-cutting theme.

2. Status of Manufacturing Sector in Africa

Manufacturing sectors in most African countries remain small compared to other developing countries and have remained inward looking with the exception of Mauritius and recently Madagascar. For the sample of African countries, growth in manufacturing over the period 2000 - 2002, was in the range of 3-5 % range annually with the exception of Mozambique which grew at over 9 %. In Mozambique, high growth rates could be attributed to Mega -investments in capital intensive projects like Mozal. In addition, few African firms export at least 20% of their sales, particularly given the smaller size of their domestic markets.

Generally, the manufacturing sector in Africa is characterized by the smaller share contribution in GDP than the average LDCs, smaller size of manufacturing export than the average LDCs and a smaller contribution of the textile industry. The manufacturing development in Asia (East and South East Asia), for instance, started from the textile industry and shifted to the capital intensive and technologically sophisticated industries (i.e. Automobile and electric appliances industries). The Asian LDCs income levels are quite similar to the African countries, yet African countries have lagged behind in industrial development. Is the difference in business environment, human capital, or industrial policies?

After trade liberalization, massive imports have been realized in African markets including those from South Asia. A few countries had realized increase in exports due to FDI, but have since stagnated or reduced at all in others. Therefore, free trade has not facilitated growth in local firms in Africa unlike in Asia. In a liberalizing world, export success is a good indicator of industrial competitiveness. The table below shows selected economic indicators from the World development indicators which gives the figures and clearly can be seen how low levels of percentages of GDP are for manufacturing growth and exports of African countries.

	GNI per capita. S	Trade % GDP	Ag, % GDP	Investment (FDI*). °oGDP*	Mfg, °oGDP (growth*)	Mfg exports °oGDP*	Mfg, % lurch exports*
Eritrea	160	111	21	39 (5.3)	8 (5.4)	-	-
Ethiopia	100	49	52	18(1.2)	7(5.0)	0.5	9.8
Mozambique	210	79	23	40 (8.6)	13 (9.2)	1.1	7.5
Nigeria	290	81	35	20 (2.4)	4(3.7)	0.2	0.2
Senegal	480	38	18	18(1.3)	13(7.3)	7.9	37
Tanzania	280	71	45	17(3.7)	8 (5.9)	1.5	18
Uganda	250	40	31	20 (2.6)	10 (2.9)	0.3	6.5
Zambia	330	75	22	18 (2.9)	11(4.5)	3.7	17.0
Kenya	360	57	19	14(0.4)	13(1.0)	3.8	22.2
Botswana	2,980	126	2	27(1.1)	5 (3.3)	-	-
Mauritius	3,850	127	7	25 (2.5)	24(5.6)	23.4	77.5
Madagascar	240	56	27	14(1.3)	12 (-4.1)	8.0	49.8
China	940	52	15	37 (3.7)	38 (8.7)	19.3	88.4
Bangladesh	380	33	23	23 (0.3)	16(5.6)	12.0	92
India	480	31	23	22 (0.6)	15(5.6)	6.7	76.5
Algeria	1,720	61	10	23(1.6)	8 (-1.0)	0.8	2.3
Morocco	1.190	66	16	25 (4.2)	17(4.0)	14.0	64.1
Bolivia	900	49	15	16(9.3)	15(1.9)	2.8	16.9**
Guatemala	1750	47	23	17(1.3)	13(1.3)	4.1	35
Nicaragua	720	73	18	29 (5.0)	14(1.2)	2.2	13.2
Peru	2,020	34	8	19(2.6)	16(3.5)	2.8	21

*Marked values are 2000-2002; others are most recent. **2002 value; oilgas have reduced this from 40% m 1999 ***Source:*** World Bank. ***World Development Indicators 2004*** (Washington. DC: 2004).

Slow growth and low export levels in manufacturing imply that African firms are characterized by low (though varying) levels of competitiveness. This is borne out in the data on specific obstacles to firm development and is also illustrated by a number of broader benchmarks.

Value added per worker (Y:L), the traditional measure of labor productivity Y:L is not a measure of the intrinsic productivity of workers or a direct benchmark of success or efficiency, in part it reflects the level of capital intensity.

Capital intensity measures the success of African countries in fostering labour intensive manufacturing along the lines of their potential competitive advantage in low cost labour. It's noted that capital intensive countries have smaller labor costs as a share of total costs.

In addition, African firms use their large quantities inefficiently; labour costs are one candidate for the source of African firms' lack of competitiveness, high capital intensity and low efficiency. Unit Labor costs measures the average cost of labor per unit of output defined in U.S dollars, as (wL/Q)*1/e; where w is the manufacturing wage; L is the amount of labour employed; Q is the physical measure of output; and e is the exchange rate (domestic currency per US dollar).

By definition, Unit labor costs are high in countries that have high wages and low value added per worker. For a country to have low (competitive) ULC it has to do a combination of three things.

(i) Keep nominal wages low,
(ii) Keep its exchange rate competitive, or
(iii) Increase its labor productivity.

From the above discussions, the following facts can be concluded;

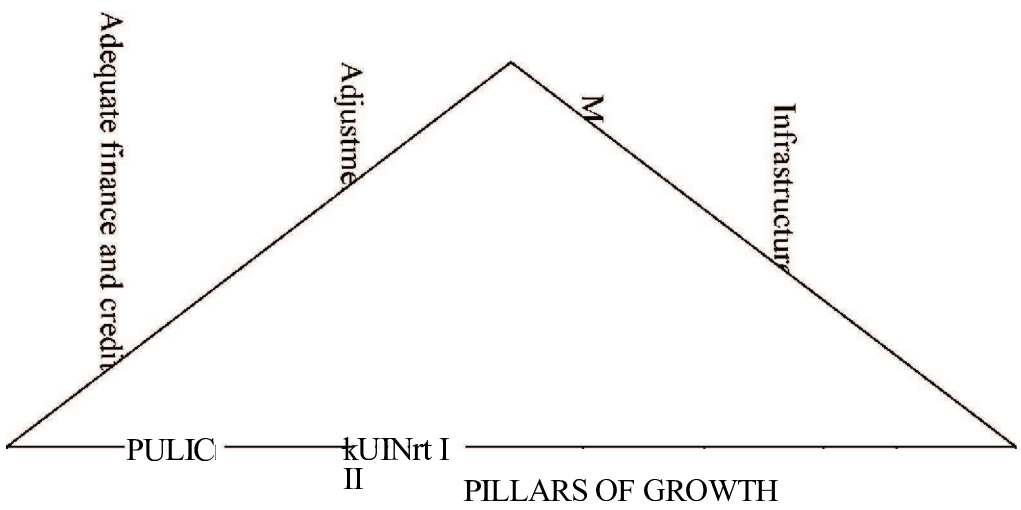
- African firms face relatively high labor costs relative to productivity
- Aggregate costs across African economies are very high, pushing up firms' costs and pushing down workers' real wage incomes.
- African workers' real wage incomes are in fact very low
- Labor costs account for a relatively small share of the total costs of African firms.

Therefore, Competitiveness must come from increased productivity and largely from lower non-labor costs and greater development of worker skills. Emphasis on improving productivity must include the business environment factors that drive up non-labor costs and drive down productivity in Africa. Such factors are associated with weak financial systems, macroeconomic instability, concentrated market structure, infrastructure and service deficiencies, over regulations, corruption, and poor security in some areas.

3. Enabling Environment: Necessary Conditions for Investments and Exports in Africa

The Policies, institutions, and infrastructure maintained by African governments and the effects they have on transaction costs are crucial in encouraging or discouraging, firm specific learning

and the development of competitive advantage and exports industries. This section discusses the different aspects of the ^babl ing^nwonment, including finance and macro-economic stability; market structure, infrasmpcoved humMogyal; and Good governance and policies.



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3.1 Access to and cost of Finance

One of the most important bottlenecks facing industrial firms in Africa is access to reliable, inexpensive financing. By and large, compared with other developing nations say, East Asia, China and India, most African firms have less access to loans and overdrafts, use more internal funds, and retained earning to fund investments and operating costs, pay much higher interest rates, and are required to register many more assets as collateral. Market failures are rampant, small firms are less likely to get loans, cash flow problems are enormous, as funds are tied up in raw materials, finished goods inventories, overdue payments, and refunds owed by the governments. Weakness in banking sector, supplier-credit facilities, poor information,

communication and weak contract enforcement have led to a heavily cash based environment. Ugandan firms still report serous difficulties with finance. Interest rates and collateral requirements are still very high compared to other developing nations. However, some African governments and the government of Uganda in particular are progressively trying to address some of these concerns.

3.2 Macro-economic certainty

Although most African countries have made the most progress in basic macro economic stabilization, there are many more that have along way to go in building macro-economic environments conducive for private sector development. The uncertainty generated by rapid and variable inflation and exchange rate volatility increases transaction costs and hampers the abilities of firms to plan for the future in Africa compared to other developing countries where inflation and exchange rate volatility are low and external balances are stable. This affects productivity and competitiveness of African firms.

To fix the macroeconomic uncertainty, good monetary policies should be in place: (exchange rate policy, interest rate policy, and government borrowing policy), Fiscal policy-by limiting trade price distortions and have tax policies, strengthen banking sector, strengthen commercial courts and contract enforceability, and creation of industrial finance institutions.

3.3 Market access and adjustment Support

The Manufacturing industry in African countries has faced both market access and adjustment constraints; such as lack of inputs and costs, high local focus, low productivity, limited exports, and high competition. Market access and competition is key in producing efficient outcomes and incentives for value addition and innovation. African markets have remained highly concentrated, due to demand constraints, i.e. low incomes, high interest rates, un-sophisticated consumers, and lack of marketing.

However, some African governments have made some progress in advocating for increased market size and access; and establishment of industrial parks, Export Processing Zones, and recently promotion of industrial clusters to address production of sufficient and high quality volumes for the increasing markets, which in turn require larger amounts of raw materials. There are now some market access opportunities, such as AGOA, EU-EBA, and regional markets, (EAC, COMESA, SADC).

3.4 Infrastructure Constraints

There is a dire need of competitive and productive infrastructure in Africa. Economic sparseness is a considerable obstacle to the quality of infrastructure services on the continent, but it is clear the quality of management of infrastructure systems makes a big difference as well. The sector has suffered greatly due to poor service providers such as electricity, and railway transport. The most recent progress has been made in telecom industry where the successful incorporation of private providers of cellular infrastructure in Uganda, Mozambique, Kenya, Zambia and other

countries, has extended coverage and improved service quality significantly. The least progress has been made in electricity generation and supply with severe consequences for industrial firms. Deficient electricity service severely hurts competitiveness.

Many firms have their own generators, but the cost of privately supplied power is two or three times as high as that of public grids. In some types of production, especially of continuous process items like plastics and soap, the unexpected cessation of power can lead to weeks of lost production while machines are being cleaned.

Little progress has been made so far. Uganda has moved forward with restructuring and has redesigned policies to allow some private participation in energy development but the effects are yet to be seen. Furthermore, domestic transport costs are very high in Africa, and hurt exporters' competitiveness. It is more severe for land locked countries like Uganda, Zambia and Burundi.

3.5 Labor force skills and human capital development

The Quality of labor force and the accumulation of human capital are just as relevant for competitiveness as is physical infrastructure. Many African countries have difficulties in retaining highly educated workers or attracting skilled expatriates. Its observable that increasing efficiency is a key to firms being able to enter export markets, such efficiency will be linked to observable skills firms posses, amount of education and tenure of the workforce.

4 Concluding Discussion and Lessons for Uganda

(i). To be competitive in domestic and international markets (export markets), firms/ countries need to advance value addition, standardization and productivity by;

- Absorbing technology from the developed countries, either by attracting FDIs or improvement of the business environment
- Upgrading of the production systems, introduce new high-tech equipment and cleaner technologies, employing skilled and experienced human resource personnel, invest in skills development, R&D for new products, and improve on quality of products.
- Encourage sub-contracting terms from large companies to small and medium firms. Labour intensive industries, including service industries must also be encouraged as it improves the conditions for transfers of technology and know-how.
- Invest in marketing research and market information systems
- Policy support and harmonization of technical standards and regulations, because standards have increasingly become crucial elements in facilitating transactions and trade within and between countries.
  Establish a national financing fund and support institutions to facilitate the commercialization of R & D.

(ii) . The catalytic role of manufacturing industry needs to be acknowledged. It is vital or center for the following;

- Application of technological progress to production,
- Innovation,
- new skills and attitudes,

- modern institutions and legal structures,
- beneficial externalities from innovation and skill creation for other activities,
- direct demand stimulus,
- internalization of the economy, and
- modernization of national industrial enterprises

(iii) . Modernization of equipments and strategic policies: In the advanced countries, where all the above mentioned constraints have been addressed, a new technology or a new approach to manufacturing and way of doing business has been adapted. This is the computer integrated manufacturing developed in 1974 by Joseph Harrington, (Advanced Manufacturing Technology, 2002). It encompasses all of the activities and processes necessary to convert raw materials into finished products, deliver them to the market, and support them in the field. These activities include the following:

- Identifying a need for a product
- Designing a product to meet the needs
- Obtaining the raw materials needed to produce the product
- Applying appropriate processes to transform the raw materials into finished products
- Transporting products to the market
- Maintaining the product to ensure proper performance in the field

Technology, measurements or standards are basic industrial needs. Cooperation and collaboration remain key to developing the required tools and capabilities. In modern manufacturing, integration is accomplished by computers and the benefits are as follows: Product quality increases; Lead times are reduced, direct labor costs are reduced, product development times are reduced, inventories are reduced, design quality increases, and overall productivity increases.

(iv) . Promotion of cluster based industrial development: A new approach to doing business and economic development planning to continually be able to compete globally has been introduced. This is the Industry Cluster concept. The cluster model emphasizes internal linkages, whereby cluster gains are furthered by local firm cooperation, local institutions, and local social capital.
External linkages also matter, global buyers can help local clusters access distant markets, acquire new forms of knowledge and upgrade.

Porter argues that it is the competition between rival firms in the cluster that drives growth because it forces firms to be innovative and to improve and create new technology. This, in turn, leads to new business spin-offs, stimulates R&D, and forces the introduction of new skills and services.

Local proximity to firms in all aspects of the production process, such as the suppliers, machine builders, assemblers, distributors, and final customers allows the cooperating firms to adopt new technology and innovations rapidly, therefore increasing the overall efficiency of the production process. This approach not only emphasizes growth of manufacturing sector but also more

importantly concomitant growth of the supporting industries which incorporate the services sector

In short, cluster development is attributable to several key factors, including technology transfer, knowledge transfer, development of a skilled labor force in related industries, the benefits of agglomeration economies, and social infrastructure. Therefore, governments should build multilayered regional systems, to encourage cluster formations and the creation of high value chains.

In conclusion, to advance manufacturing competitiveness, numerous major bottlenecks need to be addressed; manufacturing modernization, policy uncertainty, poor access to finance, inadequate infrastructure, focused training and general support to National bureaus of Standards and other related standards service providers to achieve international standards equivalency (Accredited labs, skilled standards officials, and harmonized regulations and conformity standards).

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