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ASSESSMENT OF TANZANIA STEEL INDUSTRY: THE CASE OF RE-ENFORCEMENT BARS MARKET

ABSTRACT

This was part of assignment to assess the state of competition in Tanzania steel industry. A need was felt at understanding the sector at large, its performances, market structure, government's policies, legislations as well as programs and to identify challenges steel industry and proposed recommendations. To identify and understand the competition issues completely, the study was conducted in line with the Competition Assessment Framework.

The sector was prioritized due to its importance in the economy especially its connections with other sectors such as construction sector, employment and economic growth in general. the study identified three objectives to be addressed; which are; to understand steel products produced and production processes, identify relevant market(s) and competitors, examine the market structure (by shares) of relevant markets and identify challenges in the relevant markets and provide recommendations to the identified challenges.

Three set of players in the market were included in the study, these were producers, distributers and consumers in from four representative regions (Dar es Salaam, Arusha, Mwanza and Mbeya). Secondary information for the study were obtained from Government bodies, including the National Bureau of Statistics and Tanzania Revenue Authority.

It was observed that Tanzania rebar market is characterised by high unutilized capacity in that the country employed only 43% of its capacity. Further, it was found that the country imports more than it export and that generally there existed low trade volume between Tanzania and its neighbouring countries and that future trend show a further declining trend in rebar exportation. It was also revealed that there existed uncharacteristic rebar price rise. In light of the findings, it was recommended that measures should be taken to step up their production in order to take advantage of markets that are offered in the neighbouring countries and that local factories should improve efficiency in order to operate competitively and avert effects of imported re-bars.

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ALAF	Aluminium Africa Ltd
BRELA	Business Registrations and Licensing Agency
BS	British Standards
CTI	Confederation of Tanzania Industries
DFID	Department for International Development
DRC	Democratic Republic of Congo
EAC	East Africa Community
EU	European Union
FCC	Fair Competition Commission
HFO	Heavy Furnace Oil
HHI	Hirschman-Herfindahl Index
MIT	Ministry of Industry and Trade
MT	Million Tons
NBS	National Bureau of Statistics
NDC	National Development Corporation
NEMC	National Environment Management Council
OSHA	Occupational Safety and Health Authority
PVC	Polyvinyl Chloride
SA	South Africa
SCT	Single Customs Territory
SMAT	Steel Manufacturing Association of Tanzania
SPSS	Statistical Package for the Social Sciences
sSA	sub-Saharan Africa
TBS	Tanzania Bureau of Standards
TRA	Tanzania Revenue Authority
UAE	United Arab Emirates

1.1 INTRODUCTION

Tanzania's economic growth is contingent upon the growth of the Tanzania steel industry. Consumption of steel is taken to be an indicator of economic development. While steel continues to have a stronghold in traditional sectors such as construction, housing and ground transportation, special steels are increasingly used in engineering industries. Steel is manufactured as a globally tradable product with no major trade barriers across national boundaries. There is also no inherent resource related constraints which may significantly affect production of the same or its capacity creation to respond to demand increases in the global market (Bhandari et al. 2009).

Further, there are no natural monopoly characteristics in steel industry. Therefore, one may not expect complex competition issues as those witnessed in industries like telecom, electricity, natural gas, oil, etc. (Boston Consulting Group, 2007). This however, does not mean that there is no relevant or serious competition issues in the steel industry. The fact that internationally steel has always been an oligopolistic industry sometimes has raised concerns about the anticompetitive behaviours of large firms that dominates the industry.

1.2 Rationale and Justification

1.2.1 Importance of Steel Industry

In Tanzania the steel consumption per capita is very low. The consumption of steel per capita is a good barometer to judge any country's development. However, the industry is booming because of the emerging construction activities in airports, roads, housing, water, electricity, and engineering among others in the country. As long as construction and manufacturing sector are booming, steel manufacturing is expanding. The industry has noticed a tremendous growth within a short span of time and producers are striving to ensure that the growth is maintained. According to steel manufacturers, the growth is facilitated by government's policy that so far encourages the investment in steel industries. The government has zero rated import duty for the principal raw materials and maintained import duty of finished products at 25 percent in order to encourage growth of local steel industry.

The construction sector grew increased to 16.8% in 2015 from 14.1% that was registered in 2014. The growth was attributed by increased economic activities especially the construction of residential, business and infrastructure development (URT, 2015). Such an increased scale of growth made construction to be the second largest GDP contributor, only behind agriculture. Construction activities normally goes hand in hand with steel usage as more construction activities that are being carried out requires an increased demand in steel products. During this period, production of steel and related products increased alongside other construction related items as follows steel (12.5%), cement (12.2%) and sheets (5.3%). The increase was attributed to increased demand from within and outside the country.

These future growth rate are projected to grow further in coming years which will eventually cause growth precipitations in the steel industry. The rapid growth of Tanzania's cities

population, engineering, transportation and electricity sector has exerted pressure, prompting steel producers to embark on ambitious projects in a bid to close the deficit.

Tanzania's steel industry has been growing tremendously in recent years precipitated by increased consumption on roads and bridges; residential and non-residential buildings; airports; water infrastructures, electricity and engineering infrastructures. This has seen increased per capita consumption from 6.3 Kg recorded in 2008 to 9.7 Kg in 2011[1]. There has been equally increased number of producers from 3 in 2006 to 23 in 2013[2], which has seen increase in both installed and production capacity.

It is important to note that, the Government made some effort to ensure affordable access to steel products by strategically changing the taxation regime to protect local industries from foreign imports. These measure are undertaken under the common external tariff[3], which are done in coordination with other East African partner states, as part of its trade objectives under the EAC protocol. Products affected by the changes include; steel reinforcement bars and angles, iron or non-alloy steel, flat rolled products, bars and rods of iron among others.

The research could not find any evidence whether spare parts for the iron milling factories and exports are subject to taxation. Further, goods that are produced within the EAC member states are chargeable are zero-rated, provided that they fit criteria of rules of origin (URT, 2015). The measures are undertaken strategically to protect local industries from foreign imports.

Despite these measures, there has been a growing concern on increased consumer prices in the local market. The price of steel products (including the rebars) has been on rise by 3.43% in five year period of 2000-2005 period and 61.66% in 2005-2010 period, which is equivalent to 1695.23% increase[4]. Ten year after this period, the market price rose by 69% from that recorded during 2005-2010 period. It is against this backdrop, that this undertaking was initiated in order to identify market dynamics and embedded challenges in this market.

1.3 Objectives

In general, the study seeks to assess state of competition in the re-enforcement bar production and distribution market. Specifically to:

i. Understand steel products produced and production processes;
ii. To identify relevant market(s) and competitors;
iii. To examine the market structure (by shares) of relevant markets;
iv. To identify challenges in the relevant markets.

[1] Steel Statistical Yearbook 2012
[2] Sutton and Olomi, 2013
[3] Under the common external tariff arrangement, levies for finished iron and steel imports were increased from 10% to 25% or charge of specific duty at rate of $200 per metric ton, whichever is higher3.
[4] Computed from NBS Data Submissions

1.4 Research Methodology

A combination of desk search, onsite primary (interview with key stakeholders in the sector) and secondary information collection was employed in execution of this work. To the extent possible, the Competition Assessment Framework was used as the methodological framework in assessment of competition.

1.4.1 Data Collection

Information related to general understanding of the sector performance and empirical review was obtained through desk search and review of various publications from MITI, MOE, CTI and Steel manufacturers. Secondary information related to performance of the industry was obtained from steel manufacturers association, main distributors, selected contractors, NBS, TRA and others. With regard to primary source of data, survey was employed to manufacturers while purposely sampling procedure was employed to select respondents in respect of key consumers, contractors, and distributors. Instrument for primary data collection was checklist based on specific objective of the study.

1.4.2 Analysis of the Data

Information regarding trends of key performance indicators such as capacities, productions, sale, prices, export, imports, costs; were used to present and assess the performance of the industry.

1.4.3 Tools of Analysis

MS Excel and SPSS was used in analysing trends of various variables and indicators in the industry.

1.4.4 Study Areas and Units

The study covered Dar es Salaam, Arusha, Mwanza and Mbeya regions, where the study units included institutions and individuals within the industry specifically producers of re-bars, distributors and building contractors and Government bodies.

THEORETICAL AND EMPIRICAL LITERATURE REVIEWS

In contemporary economics, theoretical aspects related to collusive agreements are based on traditional economics and game theory economics. Under both traditional and game theory aspects, collusive agreements is considered to be a non-optimal market organization with devastate penalty on both competition and consumers wellbeing (Nikodym, 2014). A collusive agreements can be defines as market structure with ability to use market power to excludes its competitors or disadvantage consumers, through use of price dumping and production restraint. In practical and theoretical facet, cartels agreement is highly prohibited due to its underlying negative economic outcomes and welfare consequences. The key assumptions under cartel are; first all agreements based on a voluntary agreement between producers and second is that all agreement based on the intentions to set/fix prices, hold down/ restrict output and collude in bidding or tendering.

Not all industries are suitable for collusive agreement. The structural factors that smooth the progress of collusive agreement among firms or business entity include concentration levels (number of firms in industry) and their relative sizes, positive entry barriers to market and extent to which substitutable goods are available[5]. Tools for agreement consists of price agreement, production constraints agreement, creation of market entry barriers and suppression of competition which can be formally or informal. Price agreement/ coordination are the naturally basic collusive tools whereby colluding firm use its pricing policy against competitive producers and/or against consumers. Market entry restriction also considered to be part of potential tool for collusive agreements. An effective collusive behaviour may be conditional upon the creation of market entry barriers, which requires distinguishing those barriers created through government intervention. Under the absence of influence of international trade, monopolization of input suppliers is also cited in much literature as key tools to prevent new entrants.

Collusive agreement can be formally or merely verbal agreement between firms/producers. Assisting facilities between colluding firms consist of exchange of information, RPM[6] and meeting competition clause through market transparency. According to Prokop (2009) there are two analyses pertain to collusive stability. First analysis holds that even though the profit driven firms has incentive to restrict competition by forming agreements, the collusion has been always unstable as competitive forces keep destroying the cartels (prisoner dilemma). Second analysis hold that there are market where stable cartels may be created and persist. For the cartel to be stable, the agreeing parties must able to a) reach agreement b) to detect breaches (market transparency) and c) punish firms that breaches as presented by Ayres (1989).

There has been various documented cases and on-going investigations related to cartel activities in the steel industry within and outside Africa. In South Africa for instance, there have been on-going investigations involving some of major steel producers in the continent and other companies in relation to infringement of South African competition law. Some of perpetrators

[5]Green and Porter (1984) Non-Cooperative Collusion Under Imperfect Market

[6] RPM (Resale Price Mechanism) defined as agreements or concerted practices either direct or indirect manufacturers set a minimum resale price or a fixed or minimum price level to be monitored by the manufacturers.

appealed for leniency for price-fixing and market allocation on certain products, admitted it had participated in a cartel, and confirmed there had been a longstanding culture of co-operation among steel mills on prices and discounts. Further, in same market, some steel producers were accused of charging local customers at about import-parity price levels.

STEEL INDUSTRY OVERVIEW AND PERFORMANCE

2.1 Overview of Steel Industry

2.1.1 History of Steel Industry in Tanzania

The history of steel industry in Tanzania dates back to 1960s, when the first steel manufacturing factory was established in the country. Aluminium Africa Ltd (ALAF Ltd), Tanzania's leading steel and aluminium producer was founded in 1960. As part of the country's policy changes the factory was nationalized in 1973 and re-privatized in 1990s.Todate, ALAF Ltd which now operates as part of regional SAFAL Group has been manufacturing a wide range of products for roofing and allied application in its facilities at Dar es Salaam. The company is also a merchant of steel products including re-bars, universal beams and columns. Currently, the shareholding structure of the company is such that 76% of the shares are held by SAFAL Investments (Mauritius) Limited and 24% are held by The Treasury Registrar, Government of Tanzania.

Two of Tanzania's earliest steel companies, which produced re-enforcement bars (re-bar) for the construction industry, were established by the government under the patronages of the National Development Corporation. The two producers were the National Steel Corporation, established in 1966 and sold in 2000 to New National Steel Ltd as a management and employees buyout. Others are Steel Rolling Mills established in early 1970s and was privatized in 2000: it was sold to a local company called Unique Group. It is important to note that since then, the industry has registered various changes in terms of ownership transfer, scale of operation and product focus.

Table 2 below indicate the list of some of major steel producers and their respective products.

Table 1: Major Steel Producers and Products

Manufacturers	Roofing Sheets	Re-bar	Long Product	Allied Products
MM Integrated Steel Mills	√	√	√	√
Kamal Steel Mills		√	√	
Sayona Steel Rolling Mills		√		
Nyakato Steel Mills Ltd		√	√	
Bansal Steel Mills		√		
Hong Yu Steel (T) Co. Ltd		√		
Iron and Steel		√		
Aluminium Africa Ltd	√			
A.M Steel & Iron Mills		√		
Lodhia Steel Mills		√	√	√

Source: Adopted and modified from Sutton and Olomi 2012

Table 2: Major Re-Enforcement Bar Producers in Tanzania

Factories	Installed Capacities (MT)	Location	Ownership	Operations
MMI Integrated Steel Mills	360,000	DSM	Private	Local & International[7]
Kamal Steel Mills	40,000	DSM	Private	Local
Iron and Steel	12,000	DSM	Private	Local
A.M Steel & Iron Mills	20,000	DSM	Private	Local
Hong Yu Steel (T) Co. Ltd	120,000	DSM	Private	Local
Sayona Steel Mills	14,400	Mwanza	Private	Local
Nyakato Steel Mills	14,400	Mwanza	Private	Local
Bansal Steel Mills	3,600	Arusha	Private	Local
Lodhia Steel Mills	14,000	Arusha	Private	Local

2.2 Performances: Technical Aspects, Production and Trade

2.2.1 Technical Aspects of Ingots Production

2.2.1.1 Raw Materials Sources

Key raw materials needed in steel making (re-bars production) in Tanzania are recycled steel (scraps) which constitute about 95% of the production materials, the remaining 5% being other materials mostly, of fluid nature. Scrap metals constitute an array of metals of varying nature. The metals are gathered locally by suppliers, although some producers have opted to import from neighbouring countries especially from the DRC. The scraps that enter the manufacturing plants are mixed with metals of different mix of steel products, which makes the sorting process an overwhelming task. With this kind of materials delivered at plants with different level of corrosion and different chemical composition it is doubtfully if proper sorting is achieved before processing. Fluid raw materials are 100% imported mainly from abroad especially India, Russia, Japan and China.

The nature of interaction between scrap (materials) suppliers and producers may influence prices due to a) oligopsonistic power of buyers b) competition of firms on input supply c) transportation cost of bulk scrap from various places and d) state of corrosion of materials supplied. On the other hand, producing factories have been purchasing fluid raw materials from global market where firms can enjoy competitive prices at this market. In additions to metal scraps and chemicals, the production requires efficiency supply of electricity, water and heavy furnace oil.

It was observed during the research, production process causes a burning loss of about a tonnage at each stage of production. That is to say when one input 8 to 9 tons of scrap metals

[7] MMI Integrated Steel Mills has steel manufacturing and processing plants in Tanzania, Zambia, Uganda and Mozambique.

into the induction furnace, the furnace will produce about 7 tons of ingots. Ultimately, ingots produces 6 ton of re-bars in the end. It was revealed that this depends on raw materials in use, for instance the losses are minimal when imported billets are used since they contain less carbon.

2.2.1.2 Energy use

According to producers' response, energy is a key element in re-bar production estimated to form 10 - 15% of the total production cost, with 10% when machines are running at full and 15% below the installed production capacity. For typical production process that combines production of raw materials (ingots) and final products (re-bars), both electricity power and either heavy furnace oil or natural gas are required, with electricity being used to heat raw materials (scrap metals) which leads to their conversion into ingots within the induction burning furnace while heavy furnace oil (HFO) or natural gas is used in subsequent stage of re-heating the produced ingots into final products in the rolling mill. Among the visited factories, there is only factory was found to use natural gas.

However, in the event if the rolling mills were to use the ready-made billets such as the one obtained through importation or from third parties, the energy bill will be significantly low due to the reduced electricity consumption, which is typically required in conversion of raw materials (scrap metals) into intermediate products (ingots). In Tanzania, majority of producers have resorted to construct their own induction burning furnaces for local production of billets.

2.2.1.3 Conversion of Steel Scraps to Ingots:

Once recycled scraps metals are brought to the production facility they are carefully sorted and all materials that are not for production are sorted out and manually taken away from production line. The process is important, because materials with high carbon content are not suitable for production of re-bars and therefore must be removed from production line. Usually this process is done because the materials brought to the facility are usually from wide range of variety of different origin, types, chemical compositions, degree of corrosion and other properties.

After carefully sorting process, the scraps are fed into the induction furnace for melting process. After discharging the material inputs into the furnace, electrodes are lowered near the scrap metal. Massive amount of electricity is transferred through electrode to heat and melt charged scraps. To speed up the melting process in this stage, oxygen is injected into the furnace.

After melting process is complete, slags are separated from hot molten iron and various alloy element and fluxes are added at this stage to obtain precise chemical composition of the molten iron. Upon completion the molten iron is then subjected to continuous casting into hot re-rollable steel (ingots) of different sizes, shapes and chemical composition. Once the ingots have been produced they are ready to be used for making of re-bars and other iron related products. The produced ingots can be used within the factory or in some cases sold to third party customers.

2.2.1.4 Rolling Ingots into Finished Re-Bars:

Once ingots have been produced they are ready to be fed into the rolling mills for production of final products. The rolling mills contain rollers of different shapes and sizes for producing final product. The rollers are adjusted to accommodate production of varying products range; for instance the rollers can be adjusted to produce re-bars of sizes ranging from 8 – 25mm. At this stage of production various mills are employed to convert re-rollables (ingots) steel into various products including production of the reinforced bars. These mills are capable of maintaining close dimensions (sizes, length and ribs patterns) of the final products. The standard sizes manufactured ranges from 8, 10, 12, 16, 20 and 25 mm. The produced final products (bars) are then stored ready for sales (export /or local market).

Further, instead of producing ingots, producers have the option to buy ready-made ingots from overseas markets. The ready-made ingots are called billets. In 5 of the surveyed factories, only one factory was found to be using billets. Producers cited high price of billets to be the reason as to why they do not use billets and instead prefer to make ingots. It was also established that re-bars made out of billets are far more superior in terms of quality compared to that produced by ingots. This is because billets have far balanced chemical composition as opposed to ingots which are often made out of scraps with mixed chemical composition.

In Tanzania, the produced re-bars are cut in 40 feet long (about 12 metres) and varying diameter sizes in millimetres are as follows; 8, 10, 12, 16, 20 and 25. Table 3 below indicate the number of re-bars pieces per ton, which show that the number of pieces increases with reduction of sizes. It is worth noting, the locally made re-bars are not branded, which makes the products undistinguishable in terms of their producers in the market.

Table 3: Number of Re-bars/Ton

S/No.	Size (In Millimetres)	Number of Re-bars/Ton
1.	8	210
2.	10	134
3.	12	94
4.	16	53
5.	20	34
6.	25	22

Source: Market Survey 2015

2.2.2 Rebar Production Aspect in Tanzania

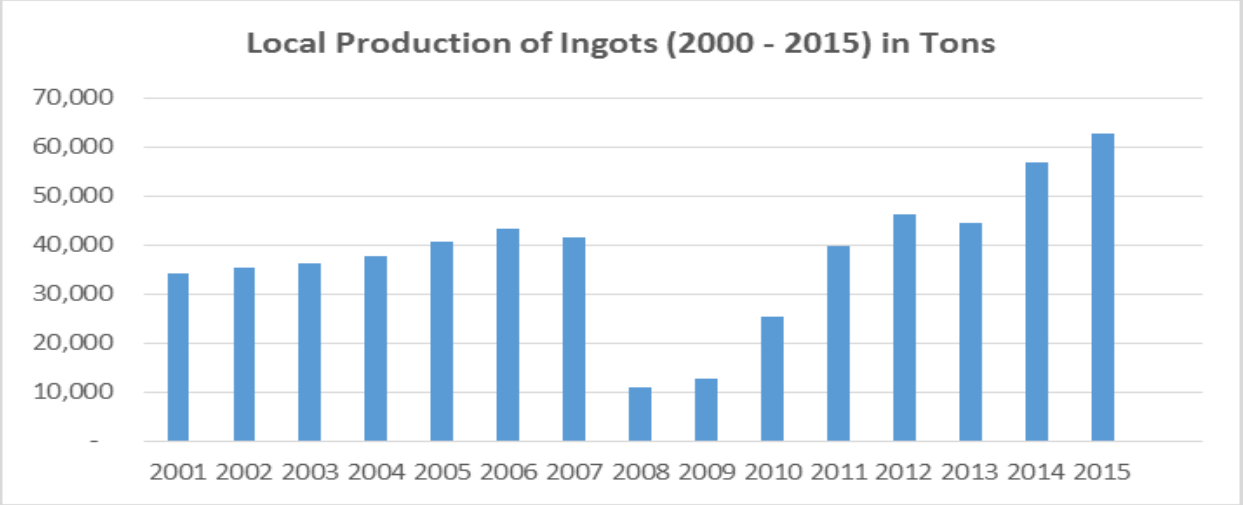
2.2.2.1 Trend of Ingots Production

It is important to note that steel producers in Tanzania uses both the locally produced ingots and the billets to make steel products. The two names though sometimes are being used interchangeably by players in the industry, it was informed that ingots are made from scrap metals while billets are imported from overseas markets. The formers is chiefly used to make rebars while the latter were used to other products such as angle bars.

Statistics data show that the local production of ingots has almost doubled over the last decade. From interviews with stakeholders within the industry, it was observed that the use of ingots has grown prominence within local producers as ingots are much cheaper compared to expensive billets which are imported from abroad. However, much as they are relatively cheaper (as claimed) it is informed that the scrap metals are normally composed of metals of mixed nature, thus making the final products produced by using such scrap metals brittle (breakable).

According to the ingot production data presented in Figure 1 below, there were a dip in ingots production in 2008, 2009 and 2010, after which the volumes recovered. While there were explanation for that decline pattern, it can be postulated that there was high influx of imported billets during those years, as rebar production figures never dropped in those years, which points to the fact that rebar production was never interrupted.

Figure 1: Local Production of Ingots



Source: NBS, 2015

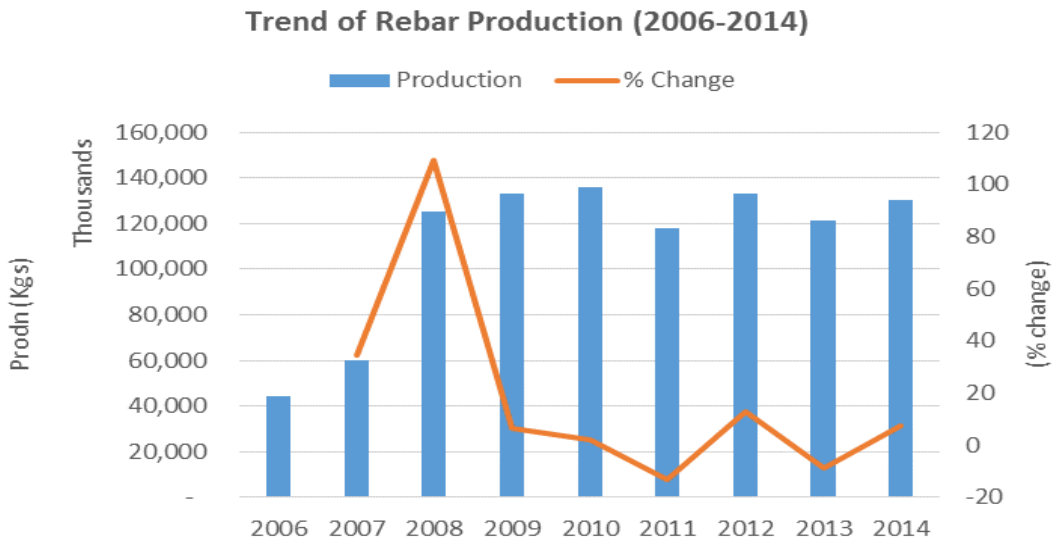
2.2.2.2 Trend of Rebar Production

Figure 2 below show that Tanzania recorded a gradual increase in re-bar production during 2005-2007 periods, a record growth was attained in 2008 period, reaching 109% increase. Post 2008 period, production has been increasing but at decreasing rate. Highest production was recorded during 2010, in which an operational production capacity of 136,000,000 Kgs was reached, perhaps, more as result of industry's increased production capacity.

Nevertheless, it is unclear as to why this rate has never been achieved in subsequent years, despite of added capacity in the industry which saw players such as Sayona Steel Mills, adding 700 MT production capacity in 2013[8]. Other players in the industry continued their investment pursuit by continuously improving efficiency through investing in human capabilities and other capital items, thereby reducing wastage and increased performance by 95%[9].

[8] Interview with Sayona Steel Mills
[9] Interview with Nyakato Steel Mills

Figure 2: Quarterly Re-Bars Production Trends in Kgs (2006 - 2014)



Source: NBS, 2015

2.2.3 Tanzania's Trade in Rebars (Import and Export)

2.2.3.1 The Trend of Tanzania Imports

Figure 3 below indicate the trend of total imports in Tanzania which show that there has been an increase in imports, especially in the last five years period. Perhaps, the striking observation in importation is that majority of importing has been done by Government entities, local steel producers, traders and builders (contractors). The rebar are being sourced from overseas markets especially China, Turkey and South Africa. It is rather unclear as to why rebars coming from neighbouring markets were insignificant, which came from Zambia. Further, even such little imports came from merchants and that there were no evidence that rebar producing factories (outside Tanzania) sell their products to the country.

The growth in imports is attributed to increased demand in imported rebars which originate from large scale public projects. The trend of increased import in the country is perhaps informed by the fact that the rebar production have shifted focus from billets to ingots dependence production. The ingots are considered to produce inferior products as compared to imported billets.

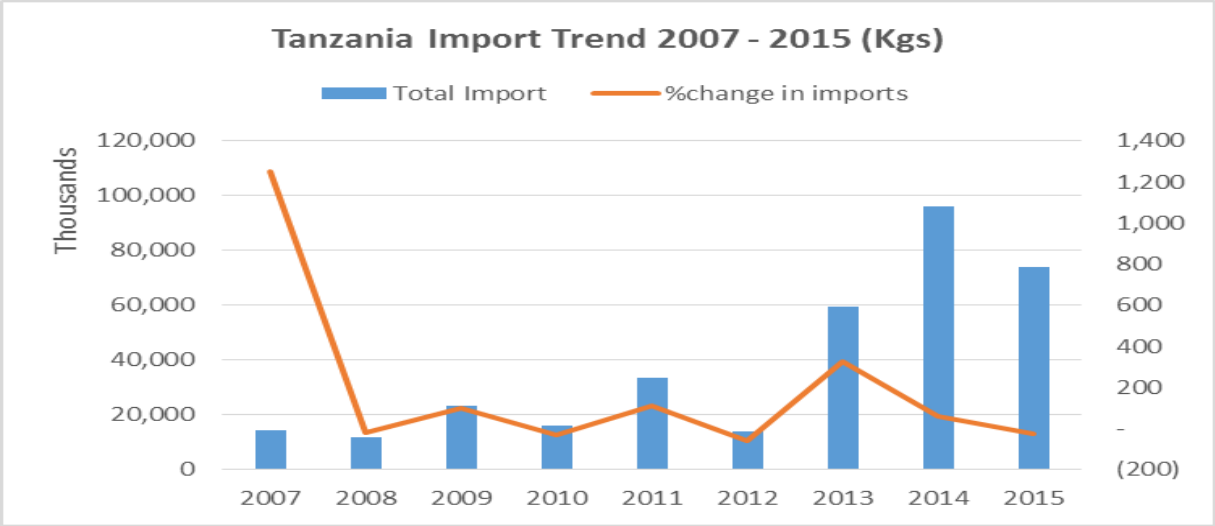
This has increasingly led to enhance demand for imports, especially from large scale users such as Government entities who prefers the use of high tensile strength materials for construction of public infrastructures including buildings, dams etc.

The trend of ingot production suggest that, increasingly the rebar production in Tanzania has shifted from dependence on imported billets to locally produced ingots, which are perceived to

have an inferior quality. The year 2007 recorded imports of about 14,000 tons, followed by sharp decline in subsequent year. The period 2008 – 2012 was characterized by an up and down interchange.

Significant import was recorded in 2011 and 2013, after which, there has a general increasing trend though at declining rate. The year 2014 and 2015 recorded a total import of about 96,000 and 74,000 metric tons respectively. As stated earlier, the growth had been precipitated by growing demand in high tensile strength rebar which is currently not produced locally.

Figure 3: The Trend of Tanzania Imports

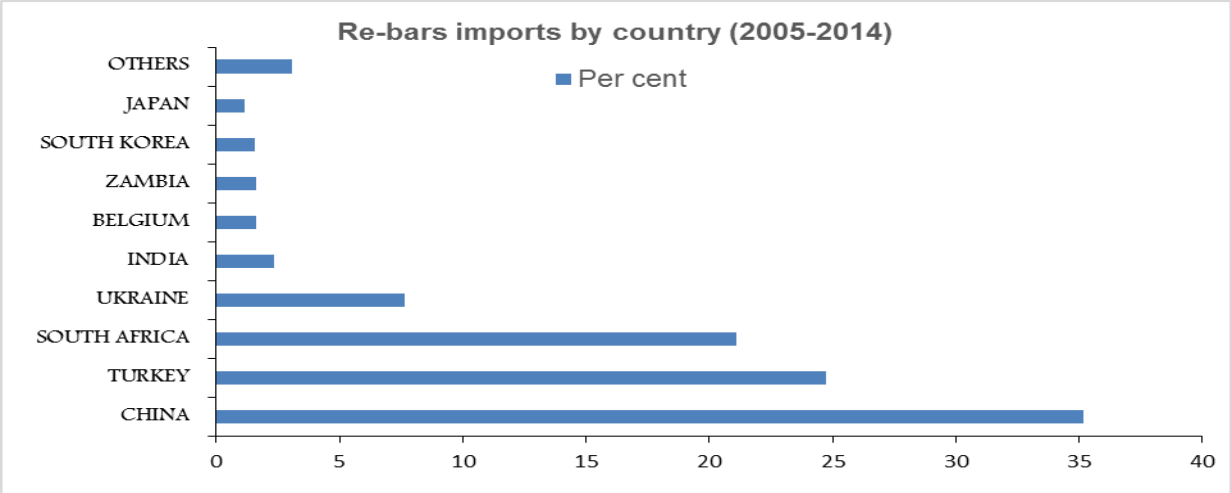


Source: TRA, 2015

- **Steel Product Imports by Sourcing Destinations (Re-Bars)**

The data on importing trend presented in Figure 4 below, indicate the country imports a considerable amount of re-bars especially from overseas markets such as China, Turkey, South Africa and Ukraine, the major importers being the local producers, traders and builders (contractors). Through interviews, it was found that the push towards importation is mainly aimed to meet the need for high tensile strength re-bars, which are not currently produced in the local market. Interview with contractors revealed that institutions are the major users of high tensile strength re-bars, especially in implementation of public projects. Such requirement are specified in tender documents on among others the type of re-bars that should be used. Detail of top ten importers is shown in figure 9 below.

Figure 4: Re-Bar Imports by Country from 2005 to 2014



Source: TRA, 2015

- **Tanzania Re-bar Exports (2007 – 2015)**

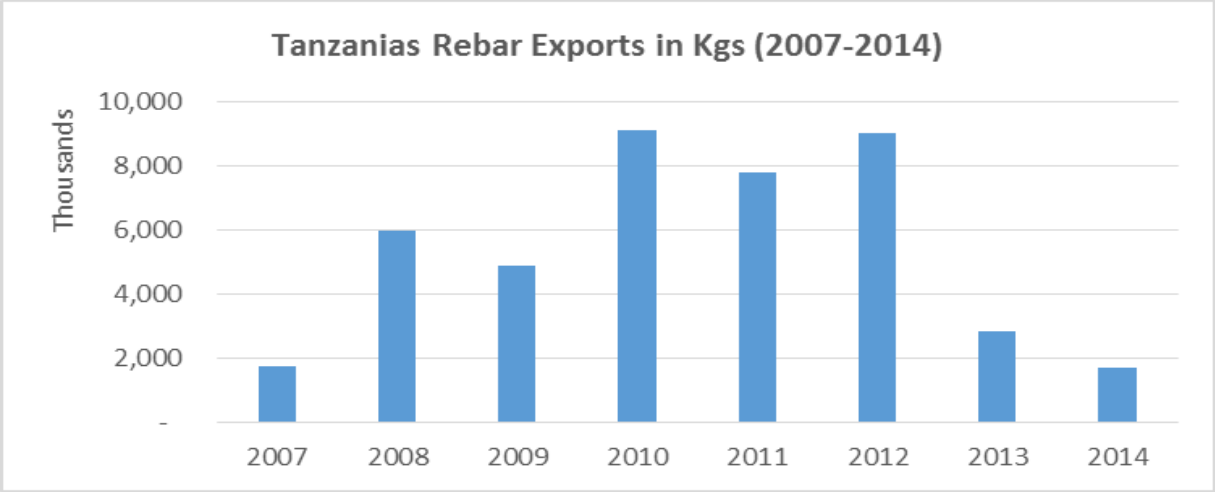
Figure 5 below indicate Tanzania re-bar exports for 2007 – 2015 period. It is important to note that major exporters are steel producers and merchants. Producers that are located in Arusha supply to the Kenyan market, while that of Mwanza (Nyakato and Sayona) supply Rwanda, Burundi, Uganda and Kenya markets.

MMI Steel supply its products in DRC market. Neighbouring markets of Zambia and Malawi are chiefly supplied by merchants[10]. The trend of export figures indicate that until 2012 period, the exports had been increasing at declining rate. The period post 2012 indicates a declining trend of the total exports, especially in 2013, 2014 and 2015.

In general, the country has had limited exports especially compared to import figures, i.e. the country is net importer of the product. It was unclear as to whether the declining pattern had anything to do with quality aspects of the produced products, though some producers cited exchange rate disadvantages to be the major source of such declining trend in exports[11].

Figure 5: Tanzania's Re-bar Exports (2007 – 2014)

[10] TRA, 2015
[11] Interview with Nyakato Steel



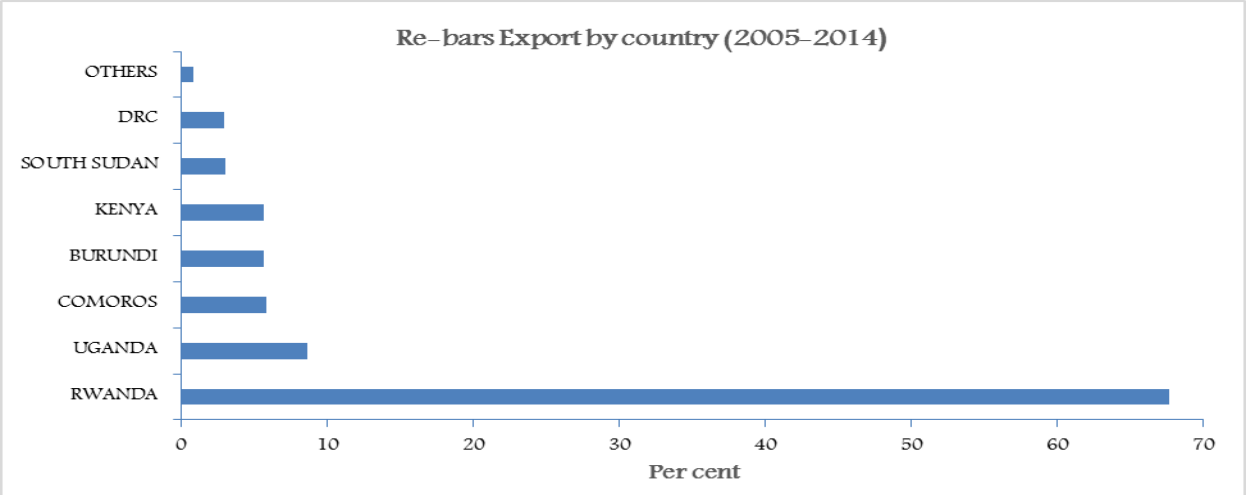
Source: TRA, 2015

- **Steel Products Export (Re-Bar)**

The data on exports presented in Figure 6 below, show that the country exports to Rwanda, Uganda, Comoro, Burundi and Kenya. It also exports though in much smaller quantities to South Sudan and DR Congo. The fact that Tanzania has huge unutilized capacity could be used by Tanzanian producers to further explore the markets of neighbouring countries, especially those with no established production facilities such as South Sudan. It is noted that the trade volumes with some of neighbouring countries such as Kenya, Uganda and Burundi could have been much higher given their proximity and size of their markets.

The degree of exportation can be said to affect with the rate at which producers are affected with the level of competition in the local market. In recent years, there has been declining trend of exportation which has been cited by some producers to have been caused by exchange rate disadvantages.

Figure 6: Re-Bars Export by Country from 2005 to 2014



Source: TRA, 2015

2.1.1 Supply Chain

In general supply chain involves interaction among producers, distributors and consumers. The illustrated value chain analysis (See Figure 7) below shows synthesis of the common production process of long-iron product manufactures particular those that uses scraps as their raw materials. This follows from the fact that most of factories in Tanzania use scraps as their main material inputs. With this in mind, we ignore the whole value chain analysis associated with iron ore exploration, extraction and iron making process. The documented value chain process in the sections below runs from scraps/ material input supply to end product consumption without going into the intricate details and technical aspects of it.

In reinforced bars production, metal scraps form large portion (approximately 50%) of raw materials inputs. Most of these raw materials are outsourced from local market scraps dealers and some are imported from neighbouring countries. The second mostly used input is chemicals which are imported from overseas specifically from India, Russia, Japan and China. In additions to metal scraps and chemicals, the production also requires effective supply of utilities such as power (electricity) and water.

The nature of interaction between metal scrap suppliers and producers have influence in determining prices due to a) oligopolistic power of buyers b) competition of firms on input supply c) Transportation cost of bulk scrap from various places d) state of corrosion of materials supplied. On the other hand factories purchases other raw materials from global market (chemicals) where firm can enjoy competitive prices at this market.

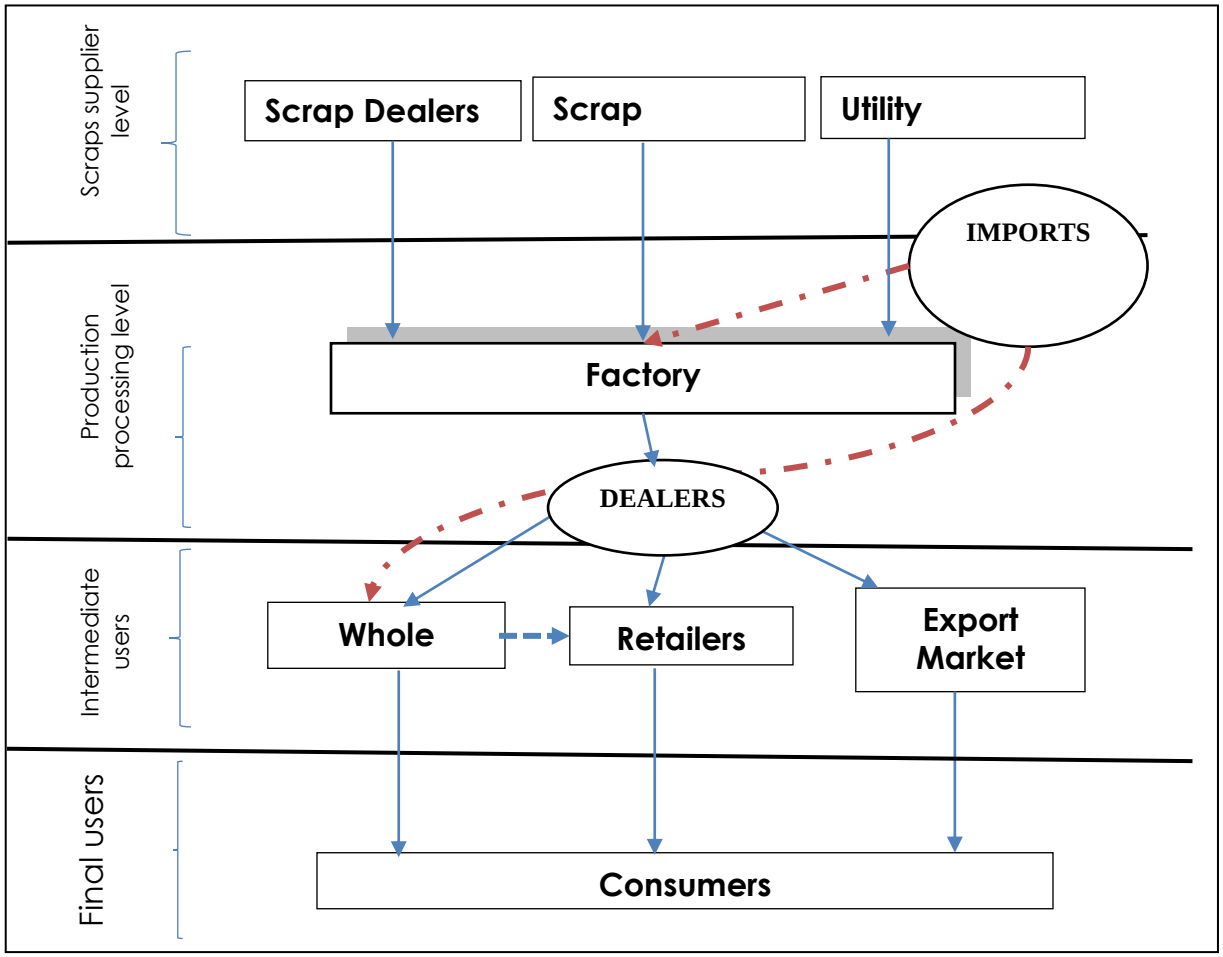
The second and foremost stage of steel value chain is steel production level of market. At this stage, purchased metal scraps are sorted into various grades by qualified experts. The process of sorting is done due to the fact that scrap metals have different origin, types, chemical compositions, degree of corrosion and other properties. After carefully sorting process, the sorted scraps are loaded into the furnace for melting process. The molten metal scraps are allowed to solidify to form more useful materials (ingots).
Various mills are employed to convert re-rollables (ingots) steel into reinforced bars. There are two process encompasses these stage, re-hearting (at 900ºc) and hot rolling. These mills are capable of maintaining close dimensions (sizes, length and ribs patterns) of the final products. The standard sizes manufactured ranges from 8mm to 25 mm. The produced final products (bars) are then stored ready for sales at local market or for export.

The nature of distribution to consumers varies among factories. Sub-contracted dealer can purchase directly from the factories, but other customers and distributors have to buy directs from these authorized dealers. These customers are prohibited to purchase directly from the factory unless they are authorized to do so by the main dealer. Small consumers usually purchases from distributors and from large shops due to the facts that factories have restriction on the minimum amount of tonnage that consumer can buy direct from the factory. Since the produced bars do not meet certain standard (especially of BS), some firms and distributors

imports product from foreign market especially South Africa, China and neighbouring countries like Kenya. Importation of bars also is done by specific whole sellers and retailers.

Then, the products are sold to customers (private individuals/contractors) for consumption (construction and other activities). There are four categories of participant into value addition of steel (re-bar) from scraps dealers, producers (factory), distributors and consumers. The interaction between these participants at each value stage can, influence the price of the products different depending on nature of markets.

Figure 7: Supply Chain Diagram



The refined picture of the supply chain from individual market perspective is presented in this section below.

- **Dar es Salaam Region**

It is important to note that all producers in the country have been sourcing the key inputs i.e. scrap metals from local dealers and chemicals from imports sources for production of steel products. DSM has several re-bars producing plants notably; Integrated Steel Mills Ltd, Kamal Steel Ltd and Iron and Steel Ltd. Consumers can access the products either directly from the producing plants or through the authorized super dealer.

However, direct access to the plants is normally subject to some strict conditions set by the plant's owners; such conditions may for instance require that the buyer to purchase certain specified volumes. In general, plant's managements discourages the direct purchase from the factory and instead encourage the purchases to be made through the designated agents. This is enforced by imposition of the threshold amount to be bought and a relative higher price in case one want to buy directly from the factory.

MM Integrated Steel Mills Ltd

According to its website, MM Integrated Steel Mills Ltd is a leading manufacturer of cold rolling sheets, structural steel products and galvanized /aluzinc roofing sheets with manufacturing and processing plants in Tanzania, Zambia, Uganda and Mozambique.

MM Integrated Steel Mills Ltd was established in 1995 and produces an array of products including reinforcement bars, black pipes, galvanized pipes, hollow rectangular pipes, square pipes, flat bars, angles, cold-rolled coils and zinc galvanized coil.

It has aggregate production capacity of 350,000 tons per annum. It export its products to neighbouring countries such as Malawi, DRC and Rwanda. Its owners also own other rebar producing factory named Sayona Steel Mills which is based in Mwanza region.

Kamal Steels Ltd.
The company is based in Dar es Salaam has rebar production capacity of around 40,000 tons per annum. It commenced re-bar production in 2004 and has heighten its distribution network across the country as well as to the neighboring countries of Zambia, Burundi, Malawi, Congo, Rwanda, etc.

Iron and Steel Ltd
The company is based in Dar es Salaam and has annual installed capacity of about 10,800 tons per annum. Its owners also owns other rebar producing factory namely Nyakato Steel Mills which is based Mwanza region.

Hong Yu Steel (T) Co. Ltd
The company is based in Kibaha, which is a small town near Dar es Salaam. It is relatively new in the industry having been officially registered in 2010. It has installed capacity of 120,000 tons per annum, which makes it to be the second single largest rebar producer, after MM Integrated Steel Mills Ltd.

- **Arusha Region**

Arusha region has two producers of re-bars, which are Lodhia Steel Industries Ltd and Bansal Steel Ltd. The former trade under aliases of Trishala and Steel Centre distributes its products through sister company namely Steel Centre which also handle logistical issues of the company. Bansal Steel Ltd, is relatively small player in the region which sell their product direct from its factory and provides customers that purchase bulk quantities with a transport service free of charge. Arusha market is also served by imports brought by various players within and outside the region. These are normally high tensile strength re-bars normally supplied directly to end users, most of whom are construction companies.

Lodhia Steel Industries Ltd
According to its website[12] Lodhia Steel Industries Ltd is one of Arusha's premier steel suppliers. Established in the year 2003, the machinery for the mill was commissioned in the same year

[12] http://www.lodhiagroup.com/lodhia-steel-industries-ltd.html

with its steelmaking operations starting in January 2004. Lodhia Steel Industries Ltd specializes in the production of round bars, deformed bars, twisted bars, square bars, flat bars, zed bars, tee sections, angle bars, hollow sections, black pipes, furniture pipes and plates. Advanced technologies are used to efficiently produce high-quality steel products.

Bansal Steel Mills
Bansal Steel was established in 2013 and specializes in production re-bar products. The factory has capacity of 300 ton per month.

- **Mbeya Region**

Mbeya region has no local production of re-bars, instead, the region obtain steel products from DSM. Interviewed traders in the region, indicated to source steel products from a designated super dealer, who is stationed in DSM. From the interviews, it was clear that producing factories would prefer that their customers to source the products from the dealer, other than direct sourcing from the factory. Even then, direct sourcing from the factory requires that a trade meet certain minimum quantity of purchase and different price to be paid (a price that is higher than he could have paid had he purchased through the dealer).

- **Mwanza Region**

Mwanza region has two rebar producers; Sayona Steel Ltd and Nyakato Steel Ltd. They serve the entire northern part of the country and does exportation to neighbouring countries of Kenya, Uganda, DRC, Rwanda and Burundi. Their products are accessible through a designated dealer and or that customers source directly from the plants. Like players in other markets, direct purchase from the plants is subject of some conditions which customers must abide by.

Sayona Steel Ltd
The company is an affiliate of MMI Steel Industries of DSM. It began its operation in 2009 with installed capacity of 500 ton per months which was upgraded to 1200 tons per months by year 2013. The main products produced by the factory are rebars of different sizes ranging from 8 mm to 25 mm. Their key markets Mwanza, Geita, Kagera, Shinyanga, Simiyu, Mara, Kigoma and Tabora. It also export to Rwanda, Burundi and Congo.

Nyakato Steel Ltd.
The company was established in 1999 as sister company of Iron and Steel Company. The establishment started its operations in 2000 producing reinforced bars of different sizes ranging from 8mm to 25mm and has an installed capacity of 1200 tons per months. The factory extended its products portfolio to include pipes production in 2005. Its key markets are Mwanza, Tabora, Singida, Shinyanga and Kigoma and export to Rwanda, Burundi, Uganda, Congo and Kenya.

2.1.2 Types of Consumers/customers

It was found that there exists two types of customers; institutional and individual customers. The former include Government and non-governmental organizations, while the latter group consist of private individuals.

It was found that institutional customers preferred the use of high tensile strength rebars. It was explained that high tensile rebar are imported from overseas market especially China, Turkey, South Africa etc. and that they were of much higher quality compared to locally produced rebars. Also the second group of customers (i.e. private individuals) preferred the use of locally produced rebars, due to their affordable prices (compared to imports). Based on the above explanation, it can be said that quality and price factors separates the two groups of users.

POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

4.1 Domestic Regulation of Steel Industry

In Tanzania, the role of the Government in industrial development is to provide enabling environment for investment by private actors through making enabling amendment to policies, laws and regulation whose provisions discriminate or tend to discriminate against private sector investors. Furthermore, the role of the government is to provide suitable environment for promotion of private sector investments, ensuring fair trade practices and competition as well as develop social and economic infrastructure including industrial support institutions.

There is so far neither policy nor specific law that govern steel industry in Tanzania, instead, the industry is subject of various legal frameworks, in the sense there many other operational Acts within the industry which players in the sector are required to comply to. The multitude of the Acts and the fact that they are enforced by different government entities has been singled out to constrain the performance of the industries. In order to overcome this challenge the Government under the BRN programme has embarked on a move to reduce and simplify the licensing requirement so that the number of licenses and permit required are reduced and the process for the issuance is simplified.

Currently, the steel industry players are required to contact among others the following government entities and ensure compliance of their Acts; Ministry of Industry and Trade[13], BRELA[14], TBS[15], NEMC[16], OSHA[17], TRA[18] and other requirements issued by the local authorities in respective areas where the players are physically present. Steel producers in Tanzania are organized under their association namely SMAT, which provides them an interface with Government especially on various issues that affects the industry. Lately, through the organization steel producers have successfully negotiated the removal of import duty that was levied on raw materials.

As per the industrial policy, stakeholders/players in the industry are also expected to align their conduct in conformity with the spirit of competition law which among others, addresses the problem of concentration of economic power that can arise from market imperfections, monopolistic behaviour in the economic activities and consequent restrictive business practices. In that respect, the competition law prohibits firms from engaging in anti-competitive behaviour, abuse of dominant position and provides for controls mergers and acquisitions in the market with the ultimate objective of promoting and protecting effective competition in trade and commerce, to protect consumers from unfair and misleading market conduct and to provide for other related matters.

[13]Responsible for registration of large scale industries
[14]Registration of business names, incorporation and issuance of business licenses
[15]Issuance and monitoring of standards
[16]Environmental matters
[17]Occupational safety and health matters
[18]Tax matters

4.2 Regional and International Trade Agreement Affecting Steel Industry

4.2.1 East African Community (EAC)

As EAC partner, Tanzania implements East African Customs Management Protocol, 2004 that among others prescribes conditions for movement of products within and outside the region. The protocol for establishing the EAC Customs Union was concluded in 2004 and commenced in January 2005 with a long-term objective of establishing a custom union, common market, monetary union and ultimately political federation in order to enhance economic, social, cultural and political development and integration.

In April 2012, the parties adopted single customs territory designed to remove restrictive regulations and internal border controls on goods moving between partner states with ultimate realization of free circulation goods. The single customs territory is implemented on three premises namely; free circulation of goods, revenue management system and regional legal and institutional framework.

At policy level, the industry has been protected in order to shield it from outside competition, with a view to protect the nascent local industry. Under the protection importation and exportation are highly regulated and as such imported scrap metals are prohibited while importation of finished steel products carries an import duty of 25%, a measure designed to protect the local industry. However, regardless of the fact that importation of scrap metals is prohibited, in the markets it was found that steel manufacturers report to source scrap metal from markets overseas especially DRC.

4.3 The Role of the Trade Association

Steel producers of Tanzania have established a joint association to help producers interface with the Government. The association was established in 1998 with the main objectives of foreseeing the development of steel manufacturing in the country. According to some of the members, the leadership of the association is on rotation basis among members. According to its members, the association has been key for lobbying to the Government for and on behalf of its members.

It was explained that, the association has been conducting its businesses through meeting of its members, who meet and discuss different challenges facing the industry. It was further explained that the association do not collect data from its members.

According to some of the members, the association has been key for them and the entire industry as it provides producers with a joint voice and present an opportunity to discuss key issues affecting them and the industry and help to channel such concerns to proper Government channels. It was explained that under the stewardship of the association, the association successfully negotiated for removal of import duty levied on raw materials destined for steel production. It has also successfully negotiated for increased duty on foreign imports from 10 to 25% to be levied on finished imported steel products.

Steel Manufacturer's Association (SMAT) consists of manufacturers of steel re-bars, steel pipes and roofing sheet makers. It was established in 1998 with the main objectives of foreseeing the development of steel manufacturing in the country. The association work together with other trade organization, particularly, the CTI to lobby to the Government on behalf of its members on issues that affects the steel industry.

5.1 MARKET DEFINITION, UTILIZATION AND PRICING

5.1.1 Market Definition

The product market is defined to be market for local supply of re-enforcement bars (re-bars).

The rebar used in Tanzania are distinguished by their origin place of production, as to whether they are produced within or outside the country. From consumer point of view, it was observed that consumers decision on which type of rebar to buy depends on price and quality of the product.

It was observed that large-scale projects involving construction of public infrastructures, the use of high tensile strength rebar was preferred. This kind of rebar is regarded to high quality rebar products much more preferred for construction of public infrastructures, due to its ductile nature. According to interviewed users, such kind of rebar is imported from overseas markets.

The other dimension of Tanzania's rebar market is on price. The high tensile strength rebar are priced relatively high compared to locally produced rebar. (Perhaps) due to their affordability in terms of price, other non-institutional users used the locally produced rebar.

Based on the above explanations, we can identify two distinct product markets i.e. market for imported rebars and the market for locally produced rebars. As these are distinct markets, this study will concentrate on the market for locally produced rebar.

Theoretically the geographic market can be construed to consist of four separate markets which are Dar es Salaam, Arusha, Mbeya and Mwanza markets.

The regions have been construed to consist of independent markets because they are separable by marked distances between them. For instance, should Dar es Salaam market taken to be a point of reference, then, Arusha market is located 675 km further north of DSM market, while Mwanza is some 1180 km further north. Mbeya market 851 km away from DSM and has no physical rebar production facility, but depend on rebar supplies from other markets, especially Dar es Salaam market.

With such large distances, transport costs become an important factor to determine product movement between markets, especially in markets with established production facilities. However, from the practical experience it was found that transport cost was not a barrier that

limits trade between the markets, as the country had only handful of production facilities that distributed the products in all regions of the country, many of which had no established plants. It was also found that there existed no relationships between the existing market prices and transport cost i.e. the prevailing market prices did not reflect the transport cost between the regions. Therefore, it was viewed that the market prices were determined by factors other than the transport cost between markets.

For this reason the geographic market is construed to be the entire country i.e. Tanzania. Therefore, we hold that, the relevant market is the market for locally produced rebar in Tanzania.

5.1.2 Capacity Utilization and Market Shares

Capacity utilisation which is obtained by dividing actual production with the potential production to measure output performance. The capacity output is the potential output, which may be equated to a maximal output or an economically derived output depending on the stock of capital and state of technology. Tanzania rebar industry experiences high capacity under-utilization, as depicted in the Table 4 below.

In overall, the average capacity utilization stand at 43%, this gives an indication that for most part, factories are operating below their potential average. The three leading producers, have the least capacity utilization; MM Integrated Steel Ltd and Hong Yu Steel (T) Co. Ltd, the two leading producers (by their installed capacity) have 47% and 9% capacity utilization, while KAMAL Steel Mills has 28% capacity utilization. Hong Yu Steel (T) Co. Ltd has been a new entrant in the rebar market, with installed capacity of 120,000 metric tons. According to their estimates, the latest actual annual production figures stood at around 11,147, which is about 9% of the installed production capacity.

Producers operating in Mwanza region (Sayona and Nyakato) each operate third quarter of their installed capacities, while in Arusha factories operate at average of 68% of the installed capacities.

Table 4: Capacity Utilization and Market Shares (in 2014) by Factories

Factories	Installed Capacities (MT)-A	Actual Production (MT)-B	% Market Share	Capacity Utilization (B/A)
MM Integrated Steel Mills	360,000	168,000	71.62	47
Kamal Steel Mills	40,000	11,000	4.69	28
Iron and Steel	12,000	10,800	4.60	90
A.M Steel & Iron Mills	20,000	NA	NA	NA
Hong Yu Steel (T) Co. Ltd	120,000	11,147	4.75	9
Sayona Steel Mills	14,400	10,800	4.60	75
Nyakato Steel Mills	14,400	10,800	4.60	75
Bansal Steel Mills	3,600	2,400	1.02	67

Lodhia Steel Mills	14,000	9,622	4.10	69
TOTAL	**598,400**	**254,569**	**100**	**43**

Source: Steel Producers

5.1.3 Market Concentration

Computation of the HHI[19] for the data that was available indicates that the markets had a concentration index of 5,255.57, which signals that market was highly concentrated.

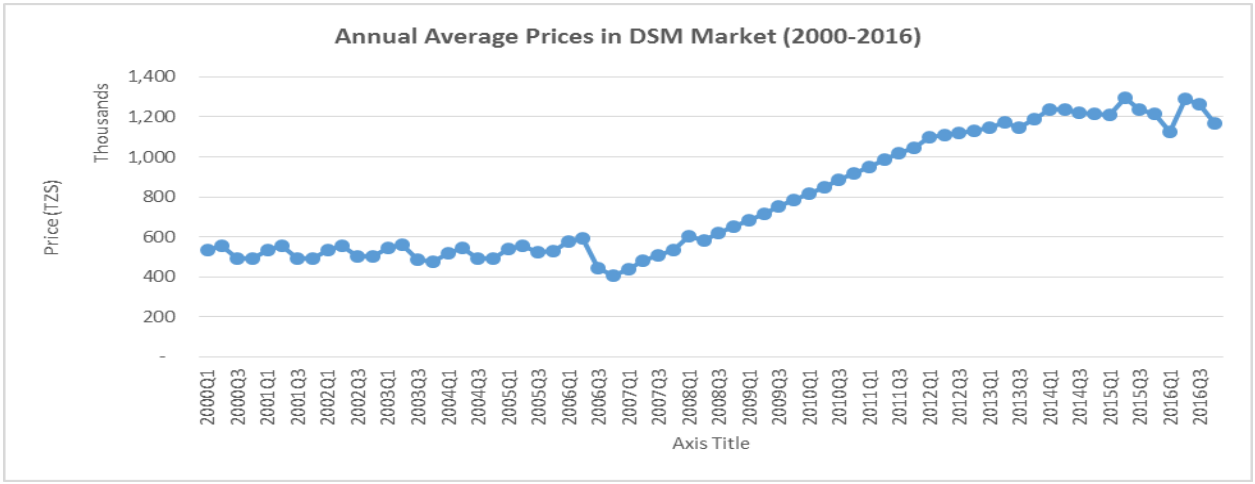
5.1.4 Pricing Aspects

5.1.4.1 Ex-Factory Prices

Figure 8 below indicate the annual ex-factory prices of some of rebar producing factories. The price trend shows that the prices during 2000 – 2006 ranged between TZS 500,000-600,000 per ton.

This price declined in third quarter of 2006 sharply and then increased sharply up to first quarter of 2012, when it increased at decreasing rate. While the trend leading up to 2006 can be expected due to the nature of the products (homogeneous and undifferentiated), it is still unclear as to why the prices have continuously registered upward trend post 2007 period. The major cost driver in the rebar manufacturing is the availability of scrap metals, which is the major raw material used (it account for about 95% of the material used). These materials, much as they vary in terms of their quality, they are readily available in the local market. We therefore, postulate that the increased price is perhaps as a result of some other external factors other than production cost.

Figure 8: Annual Average Re-bar Prices in DSM Market (2000-2016)



Source: National Bureau of Statistics

[19] Index that is below 100 indicate highly competitive market, below 1500 indicate un-concentrated market, 1500-2500 indicate moderate concentration and above 2500 indicate high concentration

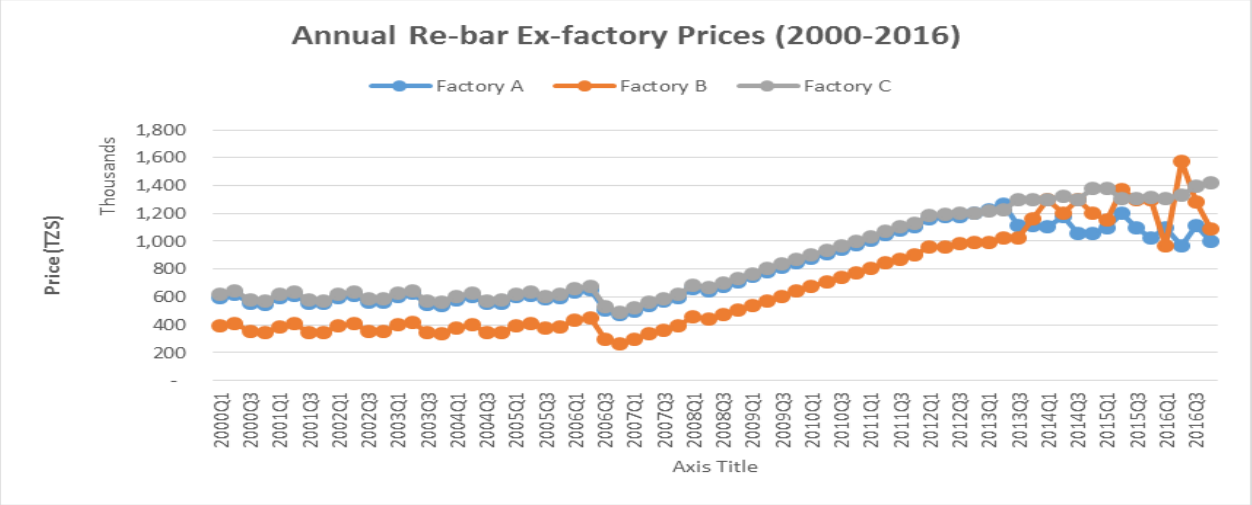
5.1.4.2 Comparison of Average Re-bar ex-factory Prices between Factories

Figure 9 below presents the re-bar ex-factory prices of three unnamed re-bars manufacturing factories that are in Tanzania. The price trend mirrors that exhibited in figure 8 above. It shows the prices charged by the factories remained unchanged during the first quarter of 2000 up until late 2006, from there it started to escalate continuously.

Further, the figure also shows that two of the factories have been charging same prices, especially through entire 2000 - 2013. The trend further show that the three factories have been effecting price changes at almost a similar pattern, which signals that factories are possibly facing similar competitive pressure. Some price differences can be noted from third quarter 2013.

Statistical analysis show that price that are charged by factories A and B have a correlation coefficient of 0.92, while that of Factories A and C to be 0.96 and B and C to be 0.98. This indicates that there is significant relationship in prices charged by the three factories.

Figure 9: Annual Average Re-bar Prices for Three Sampled Factories (2000-2016)

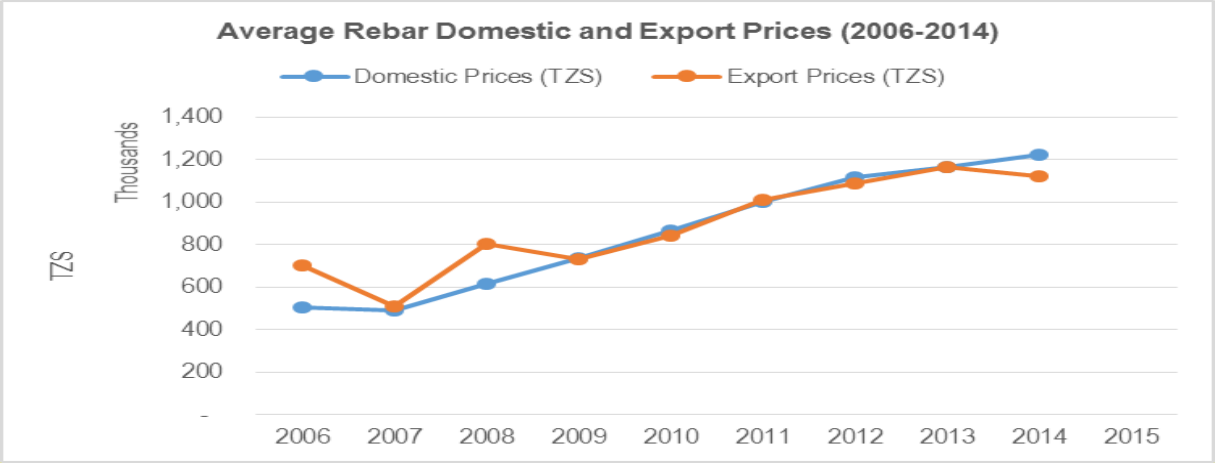


Source: NBS 2016

5.1.4.3 Export prices

The trend of rebar average export price shows that for better part, the export prices mirrors the average domestic prices. The export price declined between 2006-2007 period, the domestic prices remained unchanged during period. During 2007-2008, the both prices increased, but the increase in export prices was steeper relative to that of domestic price. From 2009, both prices were similar up until 2013, in 2014 the domestic prices was higher than export price, meaning that the rebar was more expensive in domestic market compared to that in selling destinations. Figure 10 below depict the trend of export prices.

Figure 10: Average Domestic and Export Price

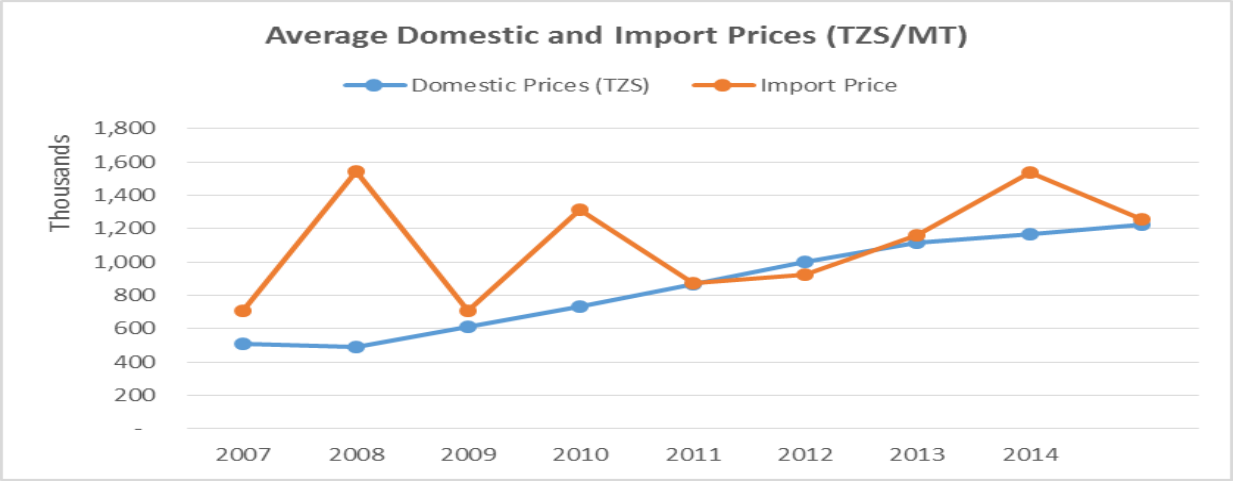


Source: TRA, 2015

5.1.4.4 Import prices

The trend of rebar average import price shows that, better part, the prices are above the average domestic prices, with exception of year 2012. In year 2012 the import price was below the domestic prices. The trend on import price is mostly determined on the changes in FOB price and taxation policy of the country. Increased FOB prices will tend to raise the trend and vice versa. Traditionally, import taxes has been strategically employed in order to protect local industries from foreign competition. It is also important to note that the imported rebars are the high tensile strength rebars. Figure 11 below depict the trend of export prices.

Figure 11: Average Domestic and Import Price



Source: TRA, 2015

5.2 CONCLUSION

Based on the above observation, the following can be concluded;

- **Existence of High Unutilized Capacity**

There is has high unutilized local production capacity. The data indicate that the country has 598,400 production capacity, but uses 254,569 of its capacity, which is equivalent to 43%. Leading producers in the country such as MMI, Kamal Steel and Hong Yu have been operating 47, 28 and 9% of their production potential.

The country's rebar production has been increasing but at decreasing rate. Highest production 136,000,000 Kgs was attained in 2010, perhaps, more as result of industry's increased production capacity. Given the current production capacity of 598,400,000 this figure represents only about 23% of that capacity.

- **Higher Imports Relative to Exports**

The data show that the country imports more than it export. Highest exports were recorded in 2010 and 2012, where the country exported about 9,000,000 Kgs. Although the pattern had been irregular, but in general the imports has been high and on a rise, for instance the change recorded in 2012, 2013 and 2014 were 327.74, 61.6 and -23.04 respectively.

- **Low Trading Volume Between Tanzania and Neighbouring Countries**

There is low trading volume between Tanzania and its neighbouring countries and that the trend show a decline in this trading volumes. The trend of export figures indicate that high trading volumes were recorded in 2010 and 2012 periods, where the export figure reached about 9,000,000 Kgs. For a country with 598,400,000 installed capacity, these volumes are insignificant. But a huge concern is that ever since the trend show a further declining pattern.

As for imports, the rebar are chiefly sourced from overseas markets especially China, Turkey and South Africa. There is insignificant volumes coming from nearby markets, from Zambia. This further, highlights that there is little trading between Tanzania and its neighbours.

- **Uncharacteristic Price Rise**

The trend of Tanzania's domestic price is rather uncharacteristic, in that, whilst, it remained unchanged for much of first six years of 2000s before it sharply increased consistently up to first quarter of 2012. This is rather unexpected given the nature of the products (homogeneous and undifferentiated) and available of the raw material. We therefore, postulate that the increased price is perhaps a result of some other external factors other than production cost.

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