

# **VALUE CHAIN ANALYSIS FOR CORRUGATED PAPERBOARD PACKAGING SECTOR FIRMS IN KENYA AND TANZANIA**

---

**BY LUCAS W. TURUKA  
RTA RESEARCHER  
24 SEPTEMBER, 2008**

## **INTRODUCTION**

Corrugated paperboard packaging is the production of boxes and other kinds of containers using corrugated paperboards. Packages can also be produced using glass (e.g. bottles), plastics (e.g. bottles and bags), aluminium (e.g. boxes), iron (e.g. containers) and metal (e.g. cans).

Almost everything grown (e.g. crops, flowers, fruits), mined (e.g. precious stones) and manufactured (e.g. motor accessories, spare parts, leather products, textiles) needs to be packaged using corrugated paperboard boxes to facilitate storage, movement to a different place, local distribution and exportation.

Firms in the industry therefore, serve many sectors such as agriculture, horticulture, manufacturing, mining, supermarkets, tourism, local distribution and export sales. Without corrugated paperboard boxes and containers performance of the above mentioned sectors will be constrained and national economies affected.

Corrugated paperboard packaging not only provides physical protection for the products, but also helps in differentiating products where there are a large number of brands competing in the same market segment, and in improving profitability and the efficiency of the physical distribution function.

This paper will focus on the performance of the East African Packaging Industries (EAPI) Ltd. based in Nairobi, Kenya, and the TLL Printing and Packaging Company Ltd. based in Dari-es-Salaam, Tanzania. At stake is value chains of the two firms. The value chains will present details of the direct and indirect costs incurred in the containers and boxes production process, together with value creation for all the actors and at all stages in the chain.

This will help us determine Gross Profits (if they exist), calculated using the formula of sales minus direct costs; and gross margins arrived at by expressing the gross profits in a percentage over sales.

The paper also looks at constraints facing the two firms, and opportunities that can be capitalized on. A conclusion and some recommendations to improve performance and productivity of the firms is included at the end of each value chain. I start with the EAPI Ltd. of Kenya.

## **1. VALUE CHAIN ANALYSIS FOR THE EAST AFRICAN PACKAGING INDUSTRIES LTD, KENYA**

### **1.1 Introduction**

East African Packaging Industries Ltd. was registered in Kenya in 1959 and entered the market by setting a factory in Mombasa for the manufacture of paper sacks. In 1967, EAPI took over Kenya Box Limited and established corrugated carton factory in Nairobi's industrial area. The company was listed on the Nairobi Stock Exchange in the early seventies with 25% of the shares in the public. EAPI operates two domain separate divisions, the paper sacks division (PSD) in Mombasa and the corrugated cartons division (CCD) in Nairobi each with their own management.

The company manufactures corrugated cartons and paper sacks. Corrugated cartons are supplied to regional industry players principally

involved in the flower export and tobacco export sectors. Paper sacks are supplied to the regional tea producing and blending companies for the export of tea.

The factory is ISO 9001 certified and has a quality assurance laboratory which is fully equipped to measure both paper and corrugated carton characteristics including a box compression machine. EAPI is the longest established and largest manufacturer of corrugated cartons and paper sacks in East Africa. Our interest in this paper is on the value chain leading to the manufacture and disposal of corrugated boxes or cartons.

## 1.2 **Prelude to the Manufacture of Boxes/Packages**

### Basic Raw Materials

The value chain commences with the procurement of inputs. The papers used in the production of corrugated are specific grades called lineboard and fluting medium. The adhesive which is applied to the tips of the flutes is starch usually originating from products of natural origin the most common being maize (corn). For operations of one month (30 days of work) the requirement and cost of the above materials given the capacity of the firm stands as follows:

- Lineboard (18 tons) costs           \$63,000
- Fluting medium (14 tons)           \$32,000
- Starch (1/4 ton) costs               \$ 600

Sub Total	\$95,800
-----------	----------

Some raw materials are procured from local companies such as Kenya Litho (10%), Paper Converters Ltd. (8%), Carton Manufacturers (4%) and Packaging Masters (1.5%). Some are imported from sister

company in Canada, the Canadian Packaging Industry Ltd. (11%) and the Caribbean, Caribbean Packaging Industry Ltd. (5%) The EAPI produces the balance of the paper based raw materials.

## 2. **COST OF MACHINERY & PRODUCTION**

### 2.1 **How is Corrugated Made?**

The corrugator machine is required. A corrugator is a set of machines in line, designed to bring together three, five or seven sheets of paper to form single, double or triple wall board. The operation is a continuous process. The corrugator costs about \$28 million and can last 15 years. Its main components are given herein below. The way corrugated is made is that reels of paper are fed into the corrugator, the paper is conditioned with heat and steam and fed between large corrugating rolls which give the paper its fluted shape in a single facer. Starch is applied to the tips of the flutes on one side and the inner liner is glued to the fluting. The corrugated fluting medium with one liner attached to it is called single face web and travels along the machine towards Double Backer where the single face web meets the outer liner and forms corrugated board. The corrugated board is then cut and stacked.

The main parts of the expensive corrugator machine are the splicer and reel stand. These are machines which feed the paper rolls into the corrugator and enables rolls to be changed without interrupting the production of corrugated board.

The single facer: This machine transforms the paper into a series of connected arches called "flutes", thanks to the corrugating rolls that are large cylinders with a corrugated profile. If the flute profile has to be changed, then the corrugating rolls need to be changed.

The double Backer: It glues the outer liner to the fluting to obtain single, double or triple wall board. The single face web is pre heated and starch is applied to the tips of the flutes. The outer liner is then bonded to the single face web to form corrugated board. It is a complex operation that requires great expertise in the pre-heating, moisture control and gluing processes.

The Bridge : This enables the Double Backer to run at different speeds from the single spacer especially when reel or order changes take place.

The Rotary Shear: After the board emerges from the Double Backer it passes under a rotary shear that cuts across the whole width of the web. This is used to chop damaged lengths of board or to effect a change over from one grade of board to another.

The Slitter/Scorer: This operation slits and scores the board into the machine direction, with the scoring which determines the style of the finished box.

The Cut-off Knives: These cut the board into the exact required lengths to obtain the corrugated sheet used in the making of corrugated packaging.

The Stacker: Finally, corrugated sheets are stacked. They are then moved directly to the conversion machine or sent to a converting plant.

## 2.2 **The Conversion Process: The Line Convertor**

This is the final stage of the process that consists in printing and then slotting, folding and gluing the corrugated board to manufacture a corrugated container. The line convertor costs \$9300. different

operations are carried out according to the customer's specification and according to the type of packaging.

The EAPI gets factory machinery imports from United Kingdom, France, Canada, Brazil. Kenya does not as yet have the technical capacity to manufacture industrial machinery and is not expected to acquire that capacity soon.

**3. HUMAN RESOURCE (LABOUR) COSTS**

The above technical process require the service of skilled personnel. To oversee production in the firm requires six engineers, four mechanical and two electrical. Four mechanical technicians and six electrical, 32 artisans and 200 labourers. The payroll bill stands as follows:

• Salary for 10 engineers	@ \$1200	=	\$12,000
• Salary for 10 technicians	@\$500	=	\$ 5,000
• Salary for 32 artisans	@\$280	=	\$ 8,960
• Salary for 200 labourers	@ \$80	=	\$16,000
• Salary for expatriate production manager		=	\$ 4,800
• Salary for 8 bus drivers	@\$120	=	\$ 960
			<hr/>
Sub Total		=	\$47,720

These are fixed and indirect costs. For a monthly bill the figure is not small. The expenses repeat the rest of the months in the year.

#### 4. **OTHER COSTS**

##### 4.1 **Cost of Utilities**

When the plant is in operation, electricity and water are consumed. This is another headache to EAPI. The costs are \$5,800 and \$1,960 respectively. Industrial diesel costs about \$7,500.

The company supplying electricity is Kenya Power and Lighting after it is generated by Kenya Electricity Generation Company. Water is supplied by the Nairobi Water Board, institutions still under the control of the state.

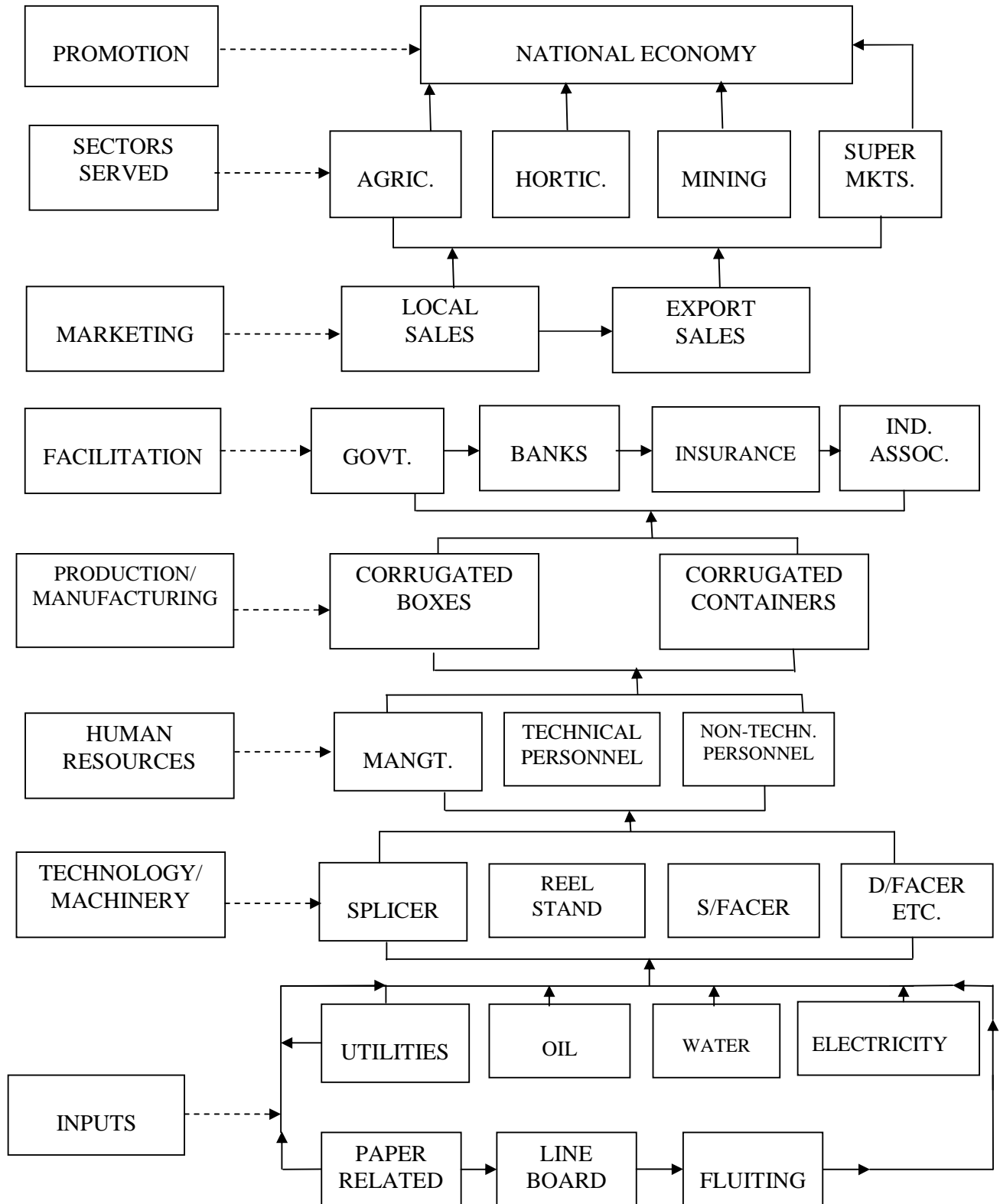
##### 4.2 **Cost of Transport**

EAPI statistics indicate \$2,500 is spent on fuel procured from Shell & B.P. Ltd. and Caltex Co. Ltd. to operate the fleet of buses catering for staff transport. Maintenance costs stand at \$690. The company has the policy of disposing tired buses before they become unserviceable.

##### 4.3 **Cost of Insurance**

The EAPI is comprehensively insured against catastrophes such as fire and industrial accidents. The premium stands at \$8,800.

## THE EAPI VALUE CHAIN



## 5. COMPANY SALES

### 5.1 Local Sales

The company is supplying paperboard boxes to agricultural, mining, supermarket, horticultural and distribution sectors in Kenya. As the longest serving company with ISO assured quality standards, EAPI has captured about 65% of the local market. This earns the company \$251,000. The market niche is likely to be retained because of product quality and reliability.

### 5.2 Export Sales

The company exports corrugated boxes to neighbouring states of Uganda, Tanzania, Rwanda, Burundi, Ethiopia, DR Congo and Sudan which makes it earn \$ 189,240.

## 6. THE EAPI'S BALANCE SHEET

### GROSS PROFIT MARGIN

<b>Expenditures</b>	
• Raw Materials	\$ 95,800
• Human Resources	\$ 47,750
• Utilities	\$ 15,260
• Transport	\$ 2,500
• Insurance	\$ 8,800
• Production .....	\$ 32,335
<b>Total Costs</b>	<b>\$ 202,445</b>
<b>Revenues</b>	
• Local Sales	\$ 251,000
• Export Sales	\$ 189,240
<b>Total Sales</b>	<b>\$ 440,240</b>
Gross Profit	\$ 237,795 = 54%

## 7. **COMPANY CONSTRAINTS AND OPPORTUNITIES**

### 7.1 **EAPI's Constraints/Challenges**

The company faces a number of constraints as listed below:

- Maintaining the acquired ISO quality standard of its products so as not to lose confidence of local and regional customers.
- Controlling labour costs so as to earn more profits possibly by localizing the expatriate position.
- Meeting the charges for industrial diesel to run the plant, water and electricity which are escalating all the time.
- Reducing dependence on raw materials from enterprises in the same sector by producing them at its factory.
- Properly maintaining plant and machinery given the ever growing cost of spare parts.
- Managing turnover of skilled workers who could be lured to join competing companies in the country and region.
- Securing land for industrial expansion both in Nairobi and Mombasa as the company is now squeezed.
- Preventing industrial or labour unrest which could undermine company productivity.
- Exporting to more countries in order to earn more foreign exchange for its strategic activities such as machinery imports.
- Engaging more in social responsibility activities to facilitate getting raw materials.
- Maintaining relations with its current overseas partners.
- Maintaining the positive relations with the government

## 7.2 **EAPI's Opportunities/Advantages**

- Increased demand of company products given expansion of economies of neighbouring states such as Tanzania and Mozambique.
- Availability of western technologies which can improve industrial efficiency and control costs.
- Availability of skilled labour given the increasing number of polytechnics and universities in the country.
- Development of global value chains which open doors for EAPI to join and benefit from.
- Positive perception about the company given its long experience allowing it to win over the competing firms entering the sector.
- Financial reserves acquired when economic conditions were good unlike the new companies operating from hand to mouth.
- Availability of a big proportion of cheap raw materials from the local environment.
- An experienced management team blended with expatriates from partnering overseas firms.
- Overseas marketing of its products using sister companies.
- Ever improving regulatory framework as the government is soliciting more foreign direct investment flows into the country.

## **CONCLUSION AND RECOMMENDATION**

The firm has the chance to remain in business. Current business is viable and can be made more viable if constraints are professionally managed and opportunities are tapped. The Kenya government has been very supportive of the company through its positive policies. The market has reacted very well to the company's products. Banks, insurance, utility and other service institutions view EAPI very positively. The EAC and COMESA have high hopes on the company enhancing its business for the benefit of regional economies

and the people of the region. The business prospects are good for the EAPI. Should all these advantages be utilized, the sky is the limit.

## **REFERENCES**

1. EAPI (2007) Annual Report, Nairobi, Kenya.
2. Jacqueline De Carlo, (2007) Fair Trade: A Beginner's Guide, Oneworld Oxford, U.K.
3. KAM; (2006), Establishing the Challenge: Kenya Competitiveness 2006, Kenya Printers, Nairobi.
4. Kenya Association of Manufacturers (KAM), (2006) Manufacturing in Kenya, Kenya Printers, Nairobi.
5. Telkom Kenya (2002), Kenya Telephone Directory/Yellow Pages, Nairobi.
6. The Author's Interview with EAPI Production Manager Following Visit to EAPI, March 10, 2008.

## **VALUE CHAIN ANALYSIS FOR TLL PRINTING AND PACKAGING CO. LTD. DAR-ES-SALAAM, TANZANIA**

---

### **INTRODUCTION**

TLLPPL was set up in 1998 by industrial Promotion Services (IPS) as a vehicle to acquire the assets of Kibo Paper Industries Ltd., a parastatal company that was being privatized under the Tanzanian government privatization. Around the same time, Tanzania Litho company, a firm which had been operating for more than 40 years was grounding its operations. It was bought by IPS and merged with TLLPLL. IPS is an affiliate of the Agakhan Fund for Economic Development (AKFED).

The AKFED injected funds to capitalize operations of TLLPPL. An experienced management team was hired from Asia, modern machinery were imported from India, Pakistan, China and the Middle East, a comprehensive training programme was organized for workers and TLLPPL operations commenced at high speed.

The company operates mainly two product groups: First, corrugated cartons: 3 ply / 5 ply glued or stitched corrugated cartons used by locally based companies. Other related products are Die Cut corrugated cartons used for various industries depending on their special requirements, Michelman coated cartons (waxed) mainly used by fish exporting companies and four process colour printed boxes and trays with rotary die cutting. Second, Litho printing and packaging materials: 4/6 colours folding strength and non-wet strengths paper, self-adhesive stitches, posters, advertisement and promotional material and leaflets.

The company, like the EAPI of Kenya reviewed in the earlier section is ISO 9001 certified with a certificate issued by Bureau Veritas, the London based

Agency on Quality Management Standards. Now well established, TLLPPL caters for printing and packaging needs of leading companies in Tanzania and the nearby countries of Central Africa.

## 1. **VALUE CHAIN ANALYSIS FOR TLLPPL**

### 1.1 **Procuring of Raw Materials**

The products of the company have been mentioned in the introduction. The basic raw materials are twofold: one is timber from which paper is made after the industrial process of pulping, paper and paperboard manufacture, manufacture of corrugated and finally boxes and other kinds of containers as per customer's specifications. Where timber is the input it costs the company \$ 19,250 to have it ready for use.

The other raw material used is waste from paddy and sisal. Tanzania is blessed to be growing a lot of the two crops hence their waste is available without any problem. Converting the waste into raw material the company has to go through the industrial processes of milling, manufacture of paper, then converting the paper into corrugated before the production of boxes and other kinds of containers. Production of this kind of raw material costs TLLPPL \$ 11,150. The total expenditure for the principal raw materials therefore is, \$ 30,400. About 75% are obtained locally with the rest imported from India, Pakistan, Saudi Arabia, and Kenya.

### 1.2 **Utilities**

The company consumes a lot of water and electricity in the materials conversion and products manufacturing process. In spite of the company having a borehole for water it still depends on Dar-es-Salaam Water Co. for the utility. Electricity is supplied by TANESCO a

parastatal monopolizing power generation and distribution. It costs the company \$ 10,910 to meet expenses of the two items. Industrial oil is also in big use costing the company \$ 2,750.

### 1.3 **Manufacturing**

The manufacturing process is not entirely different from that at EAPI. The production of corrugated boxes requires raw materials, utilities, labour or human resources plus meeting other expenses connected with insurance, consultations, services and the like. The production process itself, that is when the three components are interlinked, cost the company \$ 23,244.

### 1.4 **Labour**

The manufacture of paper, corrugated boards and corrugated boxes is a technical process which requires the engagement of technically skilled personnel. In addition to management team, the company is hiring engineers, technicians, artisans and direct labourers. Labour is costing the company \$ 39,780, an expense which cannot be avoided.

### 1.5 **Associated Costs**

The company has insured the plant because of the value of machinery and the worry of accidents and fire outbreaks. The company is also a member of the Tanzania Chamber of Commerce and Industry, Confederation of Tanzania Industries, National Exporters Association, Tanzania Union of Industrial Workers and other associations. Fees are payable to all the above. All in all, it costs the company \$ 5,230.

From the above, TLLPPL expenditure or operational costs stand as follows:

<b>Item</b>	<b>Expenditure</b>
• Raw Materials	\$ 30,400
• Utilities	\$ 13,660
• Labour	\$ 39,780
• Transport	\$ 1,950
• Insurance	\$ 3,280
• Production Process	\$ 23,244
<b>Total</b>	<b>\$ 112,314</b>

## 1.6 **PRODUCTS MARKETING**

### 1.6.1 **Local Sales**

The company sells its products to local companies such as Tanzania Cigarettes Co., Tanzania Distilleries Co., BIDCO Soaps and Detergents Ltd., Nyanza Bottlers Ltd., Shelly's Pharmaceuticals Ltd. and even Precision Air Ltd. to mention but a few. Being a well established company it receives orders from small and medium scale enterprises and even private entrepreneurs. Total local sales stand at \$ 246,670.

### 1.6.2 **Export Sales**

TLLPPL is exporting some of its products to neighbouring countries of Malawi, Zambia, Uganda and Swaziland. Some few items go to DR Congo and Mozambique. One reason export sales are not large is limitation of production and the perception regional countries have of goods originating from Tanzania. The company does not have foreign business partners like EAPI Ltd. of Kenya. Such foreign partners would help promote its products overseas. Nevertheless, the company does business to the tune of \$ 78,000.

## **TLLPPL BALANCE SHEET**

### **GROSS PROFIT MARGIN**

The company makes profit by end of the day.

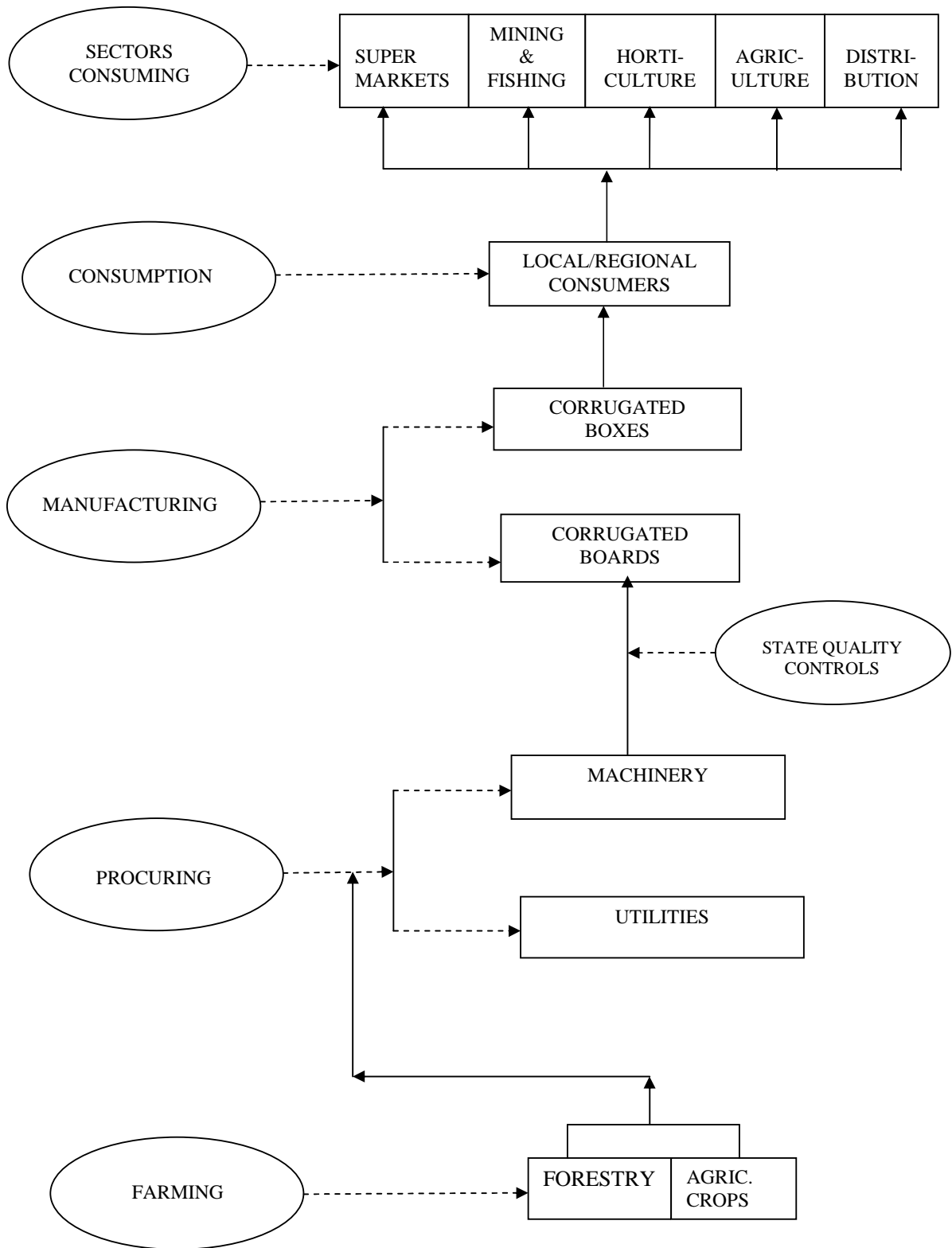
Total Expenditure	\$ 112,314		
Total Sales	\$ 324,670		
Gross Profit Margin	\$ 212,356	=	65%

The company has been making profits in the last eight years.

### **FIRM PERFORMANCE**

TLLPPL is the best performing company in the paperboard packaging sector in Tanzania. In the years 2006 and 2007 it has received Presidential Awards as the Best Performing Company in the packaging sector. Company management intends to be even more competitive and raise productivity to exceptionally higher levels.

**VALUE CHAIN FOR TLLPPL CO. LTD., TANZANIA**



## 2. **FIRM CONSTRAINTS AND OPPORTUNITIES**

### 2.1 **TLLPPL Constraints**

- An underdeveloped national industrial sector limiting orders for company products.
- Underdeveloped transport infrastructure in Tanzania making the Co. incur high road and rail costs transporting raw materials and finished products.
- A weak economy suppressing opportunities for industrial expansion.
- Limited skilled labour with colleges graduating more people in the Arts area.
- Underdeveloped economies of neighbouring states limiting their capacity to order products from the company.
- National economy's failure to support the increasing population leading to poverty and limiting citizens purchasing power.
- Escalating costs of electricity and fuel increasing company operational costs.
- Failure to join Global Value Chains which would have expanded export sales.
- Corruption in the governmental system requiring company management to tip to acquire services.
- Limited competition lowering the steam for competition.
- Wide national geographical area causing products distribution bottlenecks.
- Non-availability of industrial technology necessitating importation of machinery and spare parts from overseas.
- Limited capitalization due to non-vibrance of local banks thereby limiting operational capital.
- Overdependence on the Agakhan Fund for Economic Development blocking vision of self reliance.

## 2.2 **TLLPPL Opportunities**

- Existence of markets outside the country subject to production of goods of high quality.
- Underdeveloped competing firms allowing it to dominate local business.
- Government policy of investing in agriculture, the biggest source of its raw materials.
- Government policy of removing taxes on industrial and agricultural machinery to promote industrialization.
- Existence of Indian ocean and rivers that could serve as private source of water.
- Government policy of liberalizing the energy sector allowing the company to generate and consume its own power.
- Good government investment policies allowing foreign investors to invest in industry hence possibility of getting foreign partners.
- Industrialization of Mozambique which will soon need paperboard products from neighbouring states.
- Expansion of the mining sector in Tanzania (4 gold mines, 2 coal mines, tanzanite mines etc) enhancing paperboard packaging business prospects.
- Government policy of allowing religious denominations to build universities which should output high skilled graduates soon.
- World Bank and EAC revamping the transport infrastructure which should reduce raw material and finished products' transport costs from the near future.

**3. GROSS PROFIT COMPARISON BETWEEN EAPI LTD. OF KENYA AND TLLPPL CO. LTD OF TANZANIA**

<b>Area</b>	<b>Cost at EAPI</b>		<b>Cost at TLLPPL</b>	
Raw Materials	\$ (95,800)		\$ (30,400)	
Human Resources	\$ (47,750)		\$ (39, 780)	
Utilities	\$ (15,260)		\$ (13,660)	
Transport	\$ (2,500)		\$ (1,950)	
Insurance	\$ (8,800)		\$ (3,280)	
Production	\$ (32,335)		\$ (23,244)	
Local Sales	\$ 251,000		\$ 246,670	
Export Sales	\$ 189,000		\$ 78,000	
Gross Profit Margin	\$ 237,795	= 54%	\$ 212,356	= 65%

**CONCLUSION AND RECOMMENDATION**

Both companies are operating at a profit. Both companies are faced with constraints but opportunities are also plenty. Given that Kenya is a small country hence, a small market EAPI should think of modernizing and exporting its products. Since Tanzania is a big country, hence a large market TLLPPL should expand and utilize the available local market to its advantage. Both companies have a future in the African region they operate. Their value chains can be improved for higher profit margins. They only need RTA consultancy which I am readily going to provide.

## REFERENCES

1. Author's Interview with TLLPPL Marketing Executives, 24 June 2008, Dar-es-Salaam.
2. Confederation of Tanzania Industries, (2007), Membership List,
3. Kweka, J. and Mboya P. (2004), Regional Integration and Poverty: The Case of Tanzania, ESRF, Dar-es-Salaam.
4. Maliyamkono, T.L. and Mason, H. (2006), The Promise: Tanzania, TEMA Publishers, Dar-es-Salaam.
5. Tanzania Bureau of Standards (2008) Industry Statistics, Dar-es-Salaam.
6. Tanzania Revenue Authority (2008), Statistics Dept., Dar-es-Salaam.
7. TLLPPL (2006), Annual Report, Dar-es-Salaam, Tanzania.