



Science, Technology and Innovation Policy Research Organization (STIPRO)

Tanzania EPZ Firms and their Potentials in Technology Transfer

(DRAFT)

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ABSTRACT

Technology transfer refers to a process whereby technology is moved from one physical or geographical location to another for the purpose of application. This study investigated Tanzania EPZ firms and their potentials in technology transfer. The study was carried out in Dar as Salaam, Morogor and Arusha. To achieve the desired results, literatures on EPZ were extensively reviewed and questionnaire, interviews and field observation were used for data collection. The Statistical Package for Social Sciences (SPSS) was used for data analysis. Also, OECD (2011) Framework on the classification of industries was used. Findings revealed that Tanzania EPZ firms seem to have little potential in technology transfer. This is evidenced by findings which have revealed that most EPZ have low tech firms. The study recommends that technological infrastructures of the zones need improvements so as to attract medium and high tech firms. Also, EPZ firms and those outside the zone, it is suggested that, these should be linked in one way or another in forging the anticipated technology transfer.

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LIST OF ABBREVIATIONS

EPZA	Export Processing Zones Authority
EPZs	Export Processing Zones
EPZDA	Export Processing Zones Development Authority
ICT	Information and Communication Technology
ILO	International Labour Organization
MIDA	Mauritius Industrial Development Authority
OECD	The Organization for Economic Co-operation and Development
TRA	Tanzania Revenue Authority
TIF	Tanzania Investment Forum
TV	Television
SPSS	Statistical Package for Social Sciences
STD	Standard
STI	Science Technology and Innovation
URT	United Republic of Tanzania
US	United States
WB	World Bank

CHAPER ONE

INTRODUCTION

1. Background to the Problem

After independence, many developing countries, including Tanzania, formulated inwardly focused industrial strategies such as Import Substitution Industrialization. Also, the economies of these countries were so centralized. These states were predominantly socialist, which pursued state controlled economy. However, by the 1980's import substitution programs failed. As a result, many countries including Tanzania - although more recently - resorted to Export Processing Zones (EPZs) as one form of export promotion, to liberalize and jumpstart their economies and as away to enter the global economy through international trade (Nicola, 2001). In other words, developing countries turned into an outward oriented export promotion strategy. This was to alleviate foreign exchange pressures and thus liberalize strict foreign exchange controls. The idea was that industries would be exposed to foreign competition and benefit from technology and skills transfers in order to improve productivity (*Sarah et al.*, 2004)

EPZs is the type of free trade zone set up to promote industrial and commercial export (Johansson and Nilsson, 1997). These zones offer incentives such as exemptions from certain taxes and business regulations. The World Bank (1998) sees the EPZs as industrial zones with special incentives to attract foreign investments, in which imported materials undergo some degree of processing (value-addition) before they are re-exported again.

EPZs were first used in Ireland in 1950's. However, by the 1970,s the approach spread to East Asia, Latin America and Africa (Nicola, 2009). Consequently, EPZs are now widely seen as one of the economic approaches that promote technology transfer (backward linkages) to local firms in developing countries. Many developing countries established EPZs with an objective of reaping economic gain through technology transfer, employment and foreign exchange (War (1989).

A number of studies suggest that there is a strong relationship between EPZs and technology transfer in developing countries. In the case of Korea, the most successful incidence of technology transfer is found in the EPZ. Wang (2002) stresses that workers and technicians employed at EPZ firms benefited from opportunity of having an overseas training program; and domestic firms get the opportunity to benefit from this training and skills by hiring workers previously employed in the zone firms.

Given the positive role that EPZs has played and continue to play elsewhere in the world, in 2002 the Government of Tanzania established EPZ scheme under the EPZ Act No.11 and the effective implementation started march 2003 (URT, 2006). There are several objectives for establishment of EPZs in Tanzania: to attract and promote investment for export-led industrialization with a view to diversify and facilitate Tanzania's exports and promote international competitiveness, to create and expand foreign exchange earnings, to create and increase employment and development of skilled labour, to encourage transfer of new technology, to foster linkages of the local economy to the international

market and promote processing of local raw materials for export (TIF, 2006). The Tanzanian EPZs currently include a number of sectors, namely, textile and garments, agro-processing, leather and leather products, lapidary, electrical and electrical appliances and lastly, Information and Communication Technology (ICT) industries. Eligibility criteria for EPZ investment in Tanzania include: (i) be a new investment; (ii) at least 80 percent of produced/processed products should be exported; and (iii) the annual export turnover should not be less than US\$ 500,000 for foreigners (TZS 675 million) and US\$ 100,000 for local investors (TZS 135.0 mill) (<http://www.Epza.co.tz//About.EPZ.htm>).

Export Processing Zone Authority (EPZA) has been established as an autonomous Government agency responsible for promoting investments in Tanzania EPZs and Special Economic Zones. Other functions of EPZA include development of infrastructure, issuance of EPZ business licenses and provision of business facilitation services to EPZ investors. Potential investors are supposed to contact EPZA so as to be informed of how to write the business plans indicating the type of goods to be produced or processed, production volume, volume of export and location where business is expected to be carried out. Authority also facilitates the application of memorandum and article of association and certificate of incorporation (<http://www.Epza.co.tz//About.EPZ.htm>)

1.2 Statement of the Problem

As earlier pointed, one of the EPZs' objectives is to encourage the transfer of the new technology to local firms through various forms of linkages, including input supplies from local firms and knowledge spillovers from the employees of the EPZ. Empirical

studies such as Zakir (2007), Wang (2002), Omar and Stoever, (2008) show that technology transfer through EPZs have worked for other countries such as Mauritius, Korea and Taiwan. However, for Tanzania, little is known on the potential of EPZ for technology transfer. This study is a modest attempt in closing this knowledge gap.

1.3 Objectives of the Study

1.3.1 Main Objective

To investigate Tanzania EPZs firms and their potential in technology transfer.

1.3.2 Specific Objectives

- To identify the characteristics of Tanzania EPZ firms.
- To determine the relationships between firms in EPZs and those outside
- To identify difficulties facing EPZ firms in Tanzania

1.4 Research Questions

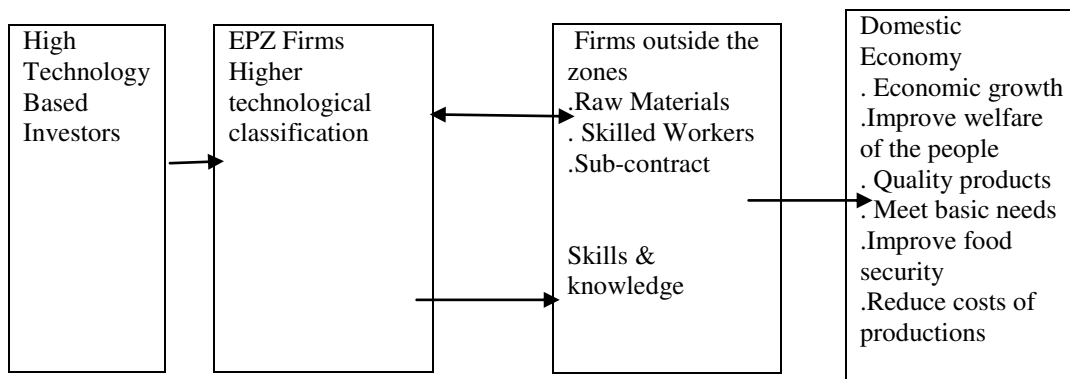
- What are the characteristics of Tanzania EPZ firms?
- What is the relationship between EPZs firms and those outside the zones?
- What are the difficulties facing EPZ firms in Tanzania?

1.5 Significance of the Study

This study is expected to provide knowledge on the Tanzania EPZ firms and their potential in technology transfer. In addition, it will contribute to policy formulation and strategic intervention by government on EPZs. Lastly, the study may also provide reference for other researchers intending to conduct studies on the related issues.

1.6 Conceptual Framework

The conceptual framework used in this study is summarized in Figure 1. It is assumed that for EPZ firms to have potential to transfer technology to the outside firms, they must be in technology intensive sectors. In connection to this, firms outside the zones linked to EPZ firms, either through buying or selling, or any other joint engagement, would strengthen their technological capabilities.



Source: Researcher, 2012.

Figure 1: Conceptual Framework Representing Technology Transfer between EPZ Firms and Non EPZ Firms

Using this conceptual model, it is easy to see the kind of EPZ firms that have potential for technology transfer. High-tech and intermediate firms have potential for technology transfer to the outside firms (Cling, 2001). Such firms may be important in enabling the outside firms to acquire new skills like production methods, and quality control. An EPZ firm with low technology would be rigidly unable to transfer technology to the firms outside the zones.

This study used this model to study the kinds of firms found in Tanzania EPZ. The aim was to know the level of technology found in Tanzania EPZ firms and their linkages with external firms. This was to enable the researcher to assess their potential for technology transfer.

1.8 Limitations of the Study

During survey some investors were in the process of becoming the non-member of EPZ. Therefore, they were not ready to provide the required information.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a survey of literature - both theoretical and empirical. It begins with definition of terms relating to the topic under the study, namely: “Technology transfer”, “Mechanism for technology transfer”, and EPZ and mechanisms for technology transfer and innovation.

2.2 Technology Transfer

“Technology transfer refers” to a “process whereby technology is moved from one physical or geographical location to another for the purpose of application”. The transfer can take place either domestically from one sector or firm to another or, it can take place across national boundaries, from one country to another (Jafarahiel, 2001). Kanyak (1985) has also defined technology transfer as the “transmission of know-how to suit local conditions, with effective absorption and diffusion both within a country and from one country to another”. However, technology transfer may not always involve transfer of machinery or physical equipment only. It can also be transferred through training and education (Van Gigch, 1978). Generally, technology transfer is a diffusion of skills and knowledge from the place of origin to other areas.

2.3 Channels and Mechanisms for Technology Transfer

Technology transfer can take place through direct or indirect mechanisms. The direct mechanisms are those used when the recipient is in direct contact with the supplier of technology. Direct forms of transfer include direct contracting of individual experts and

consultant companies. They are engaged in engineering design and plant construction enterprises, training nationals for specific production projects, technical information activities, and transfer of the process technology embodied in capital goods by importation of equipment purchased directly from machine manufactures (Cooper and Sercovich, 1971).

On the other hand, indirect mechanisms are those which do not involve an actual agreement between supplier and receiver of technology. It may be an export of high-technology products and capital goods, reverse engineering, exchange of scientific and technical personnel, science and technology conferences, trade shows and exhibits, education and training of foreigners, commercial visits and open literature such as journals, magazines, technical books, and articles (Erdile and Rapport, 1988). For the purpose of this work, both direct and indirect mechanisms were examined so as to understand how EPZ firms in Tanzania transfer technology to the firms outside the zones.

2.4 EPZs and the State of Science, Technology and Innovation

One of the objectives for establishment of EPZs in a country is to encourage transfer of new technology to local businesses. A number of countries have made attempt to transfer technology this way, and the results are mixed. Some countries have managed, while others have failed. For example, Wang (2002) stress that EPZ contributed greatly to technological capabilities of Korean firms. On the other hand, many countries have failed to diffuse new technologies from EPZ to local firms. Some of the reasons for this failure have to do with original objectives of EPZs. In some countries EPZ are put in place with primary objective to generate more employment, rather than transfer of technology.

2.5 Conditions for EPZ to Transfer Technology to Local Firms

According to Juma *et al* (2005) technology transfer through EPZ can work only when the long term objectives of EPZ are designed with the long-term technological capability building in mind; and the best strategy is to enhance linkage capabilities. These are the skills needed to transmit information, skills and technology to, and receive them from, component or raw material suppliers, subcontractors, consultants, service firms, and technology institutions. Such linkages affect not only the productive efficiency of the enterprise, but also the diffusion of technology through the economy and the deepening of the industrial structure, both essential to an enterprise development (Lall, 1992). There are two main types of such linkages: utilization of domestic raw material inputs and subcontracting arrangements with domestic firms. However, these strategies are most likely to work in the areas where capital intensive and new technologies are being applied, and this is unlikely to work in low skills, labor-intensive environments of most of EPZs factories (Cling, (2001). This position is substantiate by the below review of empirical literature.

2.6 Empirical Studies

Technological progress and innovation is more rapid in high technology companies (For example electronics companies) than in industries such as textiles and clothing which represents the bulk of activity in many EPZs (Cling, 2001). This is the case of South Korea as Wang (2002) explain. In mid mid-1960s, the US-firm Comy (1965), Signetics (1966) and Motorola (1967) began to assemble transistors in Korea in order to take

advantage of cheap labour, following the lead of US firms, Japanese firm Toshiba (1966), Sanyo (1970), and NEC (1970) entered into joint venture with Korean firms. In this progression foreign multinationals contributed greatly to technological capabilities of the Korean firms. In connection to this, a comparison between EPZs with electronic industries and leather- making and clothing industries was conducted in Korea by Basile and Germidis in 1984. The results indicated that, in Masan EPZ where electronics and chemical industries dominate, about 3000 to 4000 workers had received technical training. On the other hand, in areas where EPZ firms deal with leather making and clothing industries skills were less developed. This provides strong evidence that EPZs firm specialized in electronics are better in technology transfer. In addition, Makhija (1980) notes that, the Santa Cruz Electronics Export Processing Zone in India, is faring better in transfer of technology than other industries such as textiles. Kaplinsky (1993) find that, in the Dominican Republic, where the textile industry dominates EPZ activity, technology transfer to local firms was low. All these indicate that higher tech based firms have more potential for technology transfer than the low tech. Therefore, EPZ strategies for technology transfer must target such firm sectors, if it is to work.

2.7 Training Programs in EPZ

Training in human resource is another component in EPZ program. For example, in the Republic of Korea (Masan), there is 3-month on-the-job training for operators; overseas training for skilled workers (mainly in Japan), in Taiwan (Kaohsiung), 3-month on-the-job training for operators, and cooperative training programs between school/college and the enterprise in the EPZ. In Thailand (Krabang) there is 3-month on-the-job training for operators; Off-the-job training study and experiment in the classroom and laboratory for

some workers; overseas training (at parent company) for core employees in management and technology (Takoyish and Zafris, 1998).

2.8 The Successful Story of Masan EPZ in Korea, Taiwan and China

The Masan Zone was inaugurated in 1971. By 1979 the Zone had attracted 94 firms with a total investment of \$114.6 million, and had created more than 31,000 manufacturing jobs. Almost half of the investment was in the electric/electronics industries, while textiles accounted for a very small share (less than 2 percent). More than 90 percent of foreign investment in the zone was Japanese while 8 percent was from the US. When the zone initiated operations in 1971, domestic firms supplied just 3.3 percent of materials and intermediate goods to firms in the zone. Four years later, that percentage had increased to 25 percent and eventually reached 44 percent. Consequently, the domestic value added steadily increased from 28 percent in 1971 to 52 percent in 1979 (Larry, 1996).

In all, the evidence indicates that the Korean government was very successful in encouraging backward linkages with local industries. The government ordered the zone administration to give technical assistance to local suppliers and sub-contractors. Also, preferential access to intermediate goods and raw materials was given to local companies supplying EPZ firms (Larry, 1996). In Taiwan, under government guidance, personnel from firms in the zones were placed at potential suppliers' factories to offer advice in production methods, and quality control. As a result of this effort, the domestic value-added of Taiwan local supplies increased from 8 percent of total imports to 46 percent

between 1969 and 1979. Also, in Taiwan, some cooperative training programs between school/college and the enterprises in the EPZs are being developed. These programs leave technical training to be provided at the factory rather than at the institution (Takayoshi and Zafris, 1998).

For the case of China, it began establishing EPZs in the late 1970s. Omar and Stoever (2008) reported that China established the first Shenzhen EPZ in 1978 in the sea coast of Guangdong in 1978. Shenzhen become the center for high- technology industries in 1998. High –tech industries accounted for nearly 40 per cent of industrial out put within the Shenzhen (Xie, 2000). The reason for that remarkable development was due to science and technology plan and the strategy of science and technology development to help draw engineers and technician from other parts of the country for Shenzhen EPZ. Also, Shenzhen incentive package was designed specifically to attract hi-technological investment (Omar and Stoever, 2008).

2.9 Literature Gap

The studies have shown that EPZ firms have potential for technology transfer to local firms in developing countries such as Mauritius, Taiwan, China, Korea, Hon Kong, Malaysia and Bangladesh. However, their potential is not an automatic process but through explicit strategies. Nonetheless, apart from good intention and right objectives, little is known on Tanzania EPZ firms and their potential in technology transfer. The major objective of this work is to examine the potential of the Tanzania EPZs in

technology transfer, basically by looking at their technological status, availability of training opportunities for the employees, and linkage with the firms outside EPZ.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology used in this study. The chapter is composed of description of general research approach, the study areas, population, sampling techniques and sample size. Data collection methods and analysis techniques are also included in the chapter.

3.2 Study Area

The study was carried out in Dar as Salaam, Morogoro, and Arusha. These regions are chosen for the following three major reasons: First, EPZA statistics shows that these regions have more EPZs firms compared to other regions of Tanzania. Second, EPZ schemes in these regions were established earlier than other regions. Third and finally, these are the industrialized regions of Tanzania where researcher can easily measure the way firms within EPZ interact with those found outside.

3.3 Research Approach

Two approaches were used in conducting the research. These were qualitative and quantitative. Qualitative approach was used in collecting respondents' views during the interviews and observation while quantitative approach was used to collect information from respondents through questionnaire.

3.4 Population

In this study, the target population comprised of two major stakeholders. These included the firms operating in EPZ Tanzania and staff from investor's facilitation department at

EPZA. Each category of respondents provided some information which was useful for this study.

3.4.1 Sample Size and Sampling Techniques

Data were collected from EPZ firms and EPZA headquarters. In order to identify EPZ firms operating in Tanzania, a visit was made to EPZA headquarters to get the list. According to EPZA data base, the available operating firms in EPZ were thirty (30). Out of these thirty, twenty five firms were randomly selected for interview and administering of the research questionnaire.

3.5 Data Collection Methods

Both primary and secondary sources were used to collect data. In this study, three types of data collection instrument were used namely; Questionnaire, interviews and field observation. The secondary sources were the written materials (both published and unpublished) such as, books, reports, journals and articles. These were obtained from Export Processing Zones Authority and from the internet.

3.5.1 Questionnaire

Questionnaires were of two types; open and close ended. Questionnaire was administered to the firm's managers. The advantage of using open-ended questions was that respondents had opportunities for unlimited expression of their perspectives. Closed ended-questions were also useful because they allowed respondents to answer the given items by cross checking the categories.

3.5.2 Interviews

Unstructured interviews were conducted to managers of the surveyed EPZ firms and EPZA staff. The method was advantageous because it allowed direct questions to respondents about their activities. Also, it was possible to raise other spontaneous questions which emerged from the interview.

3.5.3 Field Observations

A physical visit was made to EPZ firms. This method was used to gather information on the kind of workers present, R&D department, type of investment and kind of products produced for export. This method provided the first hand information on how different kinds of activities were being conducted.

3.6 Validity and Reliability of Data

To ensure validity and reliability of data, a visit was made to EPZA headquarters in order to get pre-information about the firms that were expected to be surveyed. Also, it helped the researcher to get a clearance letter form from the authority.

3.7 Data Analysis

The qualitative data were categorized according to the themes related to the research objectives and content analysis was used to analyze the information. All quantitative data were coded, organized, analyzed and converted into tables and frequencies, using Statistical Package for Social Sciences (SPSS) Computer Software.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents and analyses the research findings. The presentation, analysis and discussion focused on the three research objectives and questions of the study. The sub-sections of this chapter are the firm's profile, kind of firms, levels of technological capability among the studied firms, relationship between EPZ firms and those outside the zones, demonstrating potential of EPZ firms for technology transfer. Finally, problems facing EPZ firms in Tanzania were presented.

4.2 Basic Information about the Firms

This sub section- begins with analysis of the firm's profile. It gives a general picture of their potential in technology transfer by considering firms age, sector and technology intensiveness, ownership, and number of workers, workers education qualifications and the firm's origin.

Table 1: Age of the Firms

No	category	N=25	Percent
1	1-4	20	80
2	5 -9	5	20
3	10 and above	0	0

Source: Survey data, 2012

It was found that 20 (80%) of the EPZ firms surveyed were four or less years, 5 (20%) had between 5-9 years. However, the firms with more then ten years were not found. Therefore, in assessing when the firms were established, results showed that most of the EPZ firms were relatively young. Most of them were five years old.

Table 2: Ownership of EPZ Firms

No	category	N= 25	Percent
1	Foreign owned firm	16	64
2	Joint venture between the government and the foreign firm	0	0
3	Joint venture between the local and the foreign firm	1	4
4	Local owned firm	7	28
5	Joint venture between foreign firms	1	4

Source: Survey data, 2012

Findings showed that 16 (64%) of the EPZ firms surveyed were foreign owned, 1 (4%) was owned as a joint venture between local and foreigners, 7 (28%) were local owned and 1 (4%) was owned as joint venture with foreigners. However, the firms operating as a joint venture between the government and foreigners were not found. Findings revealed that most EPZ firms are owned by foreigners who take the whole business operation. Few firms were owned by the local people. This means that the local entrepreneurs are lagging behind in the export processing sector of Tanzania.

Table 3: Origin of the Firm

No	category	N=25	Percent
1	Branch of the firm located outside the country	14	56
2	Completely new business	9	36
3	Branch of the local firm	2	8

Source: Survey data, 2012

Findings showed that 14 (56%) of the EPZ surveyed firms were branch of the firm located outside, 9 (36%) were completely new businesses, 2 (8%) were branch of the local firms. Findings revealed that, most firms operating in EPZ Tanzania are subsidiary

of the multinational corporation located abroad. Few firms are operating as new businesses.

Table 4: Number of Workers

No	Number of workers	N=25	Percent
1	1-4	1	4
2	5-49	15	60
3	50-99	6	24
4	100 and above	3	12

Source: Survey data, 2012

The study found that 1 (4%) of the EPZ firms surveyed had four or less workers, 15 (60%) had 5-49, 6 (24%) had between 50-99 and 3 (12%) had 100 and above workers. These results showed that most of the EPZ firm in Tanzania had five to forty nine workers. Few had above fifty workers. This implies that most of the EPZ firms are in the category of small and medium enterprises.

Table 5: Level of Workers Education

No	category	N=2553	Percent
1	Standard seven	1959	77
2	Vocational education	214	8
3	Secondary education	126	5
4	Technical school	130	5
5	University	124	5

Source: Survey data, 2012

Findings showed that the surveyed EPZ firms had a total of 2553 workers. Out of these, 1959 (77%), had primary education, 214 (8%) had vocational education, 126 (5%) had secondary education, 130 (5%) had technical education and 124 (5%) had university education. This implies that most employees of the Tanzanian EPZ firms have only

primary level education - indicating low level of technology that is employed by the firms.

4.3 Characteristics of Tanzania EPZ Firms

This subsection focuses on the potential of Tanzania EPZ firms in technology transfer by considering technology classification of the EPZ firms, levels of technological capabilities, training programs available, R&D departments, quality control and foreign expertise.

4.3.1 Type of the Firms

The firm type is measured using three levels of industries classification according to OECD (2011). These include low, medium and high technology firms. The low technology firms include recycling, assemblage, wood, pulp, paper, paper products, printing and publishing, food products, beverages and tobacco, textiles, textiles products, leather and footwear. On the other hand, the medium technology firms include metal, chemical (excluding pharmaceutical) and electronics. The high technology includes pharmaceuticals, Radio, and TV.

Table 6: Type of the Firm

No	Category	N= 25	Percent
1	Textile	5	20
2	Agro-processing	7	28
3	Renovation of imported used cars	4	16
4	Assembling	4	16
5	Packaging	1	4
6	Mineral processing	2	8
7	Others	2	8

Source: Survey data, 2012

It was found that 5 (20%) of the EPZ firms surveyed deals with textile, 7 (28%) agro processing, 4 (16%) assembling, 4 (16%) renovation of imported used cars, 1 (4%) packaging, 2 (8%) mineral processing and others were 2 (8%). This shows that agro processing; assembling, renovation of imported used cars; and textiles are the main firms in Tanzania EPZ, which are characteristics of low tech sectors. Other firms such as chemicals, pharmaceutical, ICT and electronics, which are characteristics of high tech sectors have not featured.

Therefore, based on OECD industries classification, Tanzania EPZ firms belong to low – technology sectors. Most investors deal with agro processing, assembling, renovation of imported used cars and textile firms. In agro processing firms, food processing was the most important one. It was found that most people working in these firms were standard seven leavers. In the textile firms, clothes manufacturing such as T-shirts was the most important. In these firms, investors employed low skilled labor in cutting and assembling of textile component to produce complete cloth. On the other hand, renovation firms deals with recondition of imported used cars. In these firms, most activities are inserting lights, air conditions, radio boxes, shock up absorbers and power window installation. Others firms deal with the assembling motor cycles, farm implements, air condition and accessories, and spare parts.

In this regard, the most preferable workers in these EPZ firms are Standard Seven (low skilled) people. The argument is that, the nature of the work (low skilled activities) requires this kind of workers. For example, the process of making clothes does not force investors to find qualified workers such as technicians and engineers. These results are

similar with the study conducted by Juach (2000) in Namibia who found that most EPZ firms engaged in low skilled activities. Also, Tekere (2000) points out that EPZ firms found in Africa are merely of assembling characterized by repetitious task that require little skills. Tekere (2000) observed investments in EPZ Africa as characterized by primary activities such as textiles, clothing and agriculture.

In connection to this, the kinds of firms operating in Tanzania EPZ have little potential in technology transfer to outside firms. Their activities use simple technology, mainly in production. EPZ firms that are potential in technology transfer are those using capital intensive and new technologies. ILO (2003) revealed that EPZ in China managed to transfer technology to local firms because they concentrate more on high tech-industries, information technology and pharmaceuticals. Also, Basile and Germids (1984) compared electronic and chemical industries against leather and cloth making industries in Masan EPZ. The results indicated that, in electronic and chemical industries, about 3000 to 4000 workers have received training. With regards to clothing industries, skills were less developed. This provides strong evidence that EPZ firms with medium and high tech are far better in technology transfer than the low tech firms.

During the interview with the EPZA staff, it was revealed that investors are not willing to invest in High tech firms in Tanzania EPZ. They pointed out that some investors wanted to establish electronics firms in Tanzania EPZ. But the main problem was lack of qualified human power to make electronics. Investor thought that establishing electronic firm in Tanzania EPZ could force them to bring scientists and technicians from Japan or

Thailand. Therefore, investors thought that it was better to invest electronics firms in Thailand with a good number of scientists and technicians specialized in electronics than investing in Tanzania.

On the other hand, EPZA staff added that some investors wanted to establish Pharmaceutical firms in Tanzania EPZ. However, most of them were constrained by lack of enough qualified personnel in the pharmaceutical sector. As a result, investors decided to go to Kenya EPZ. In this matter, it can be argued that High tech firms are not found in Tanzania EPZ due to lack of qualified personnel. Another problems mentioned by EPZ staff that hinder investors in establishing high tech firms are poor infrastructure such as roads, airports and ports, electricity, water and telecommunication. Watson (2001) points out that, such countries as China, Hong Kong, and South Korea are doing well in EPZ because of well designed infrastructure. These countries have excellent airports, roads, electricity and water supply. The presence of this infrastructure attracts the High tech firms in the Zones. Since the infrastructure facilitates exportation of goods from the zone to other countries. Therefore, for Tanzania to use EPZ as medium of technology transfer, concerted effort must be made to address the above challenges. First, is to identify technology intensive sectors that country has a comparative advantage. Second, efforts have to be directed towards building of infrastructure for these areas - both physical and knowledge, including human capacity.

4.3.2 Firms Technological Capability Levels

These are the resources needed to generate and manage technological change of the firm (Bell & Pivits, 1993). Therefore, to measure the level of technological capability of the

firm, the frame work proposed by Lall (1992) is proposed. Its levels include basic, intermediate and advanced levels. The basic level is the ability of the firm to adopt new technology and make minor innovation in both products and process. On the other hand, intermediate level is the ability to improve the technology in the use of scientific knowledge and professional expertise. Lastly, advanced level is the ability of the firm to invest in R&D to develop new products, introduce major improvements in the machines and develop the new equipment.

Table 7: Firms Technological Capability Levels

No	Category	N=25	Percent
1	Basic	13	52
2	Intermediate	11	44
3	Advanced	1	4

Source: Survey data, 2012

It was found that 13 (52%) of the EPZ firms surveyed had basic level of technological capability, 12 (44%) had intermediate level and only 1(4%) had advanced level. This means that the levels of technological capability found in Tanzania EPZ firms are basic and intermediate. Firms have the ability to replicate designs; introduce minor innovation and doing assembling. Also, firms have ability to maintain quality control, manufacture goods and introduce automation processes. That may imply that, many firms in Tanzania EPZ have no ability to implement radical innovations in both products and processes. These findings reveal that levels of technological capability found in the Tanzanian EPZ have little potential in technology transfer.

As earlier pointed out, only one firm was found to have advanced level of technological capability - The Vector Health International. This firm manufactures Mosquito nets

commonly known as “Olyset Nets”. The firm is a joint venture between “A to Z Textile Mills” and “Sumitomo Chemical Company” of Japan.

The study revealed that the Sumitomo Chemical Company conducted research and invented insecticides called OLYSET and submitted results to the World Health Organization Pesticides Evaluation Scheme. During evaluation OLYSET passed all four stages of evaluation process, confirming its efficacy and longevity. The OLYSET was then incorporated into the fibers of the net during manufacturing as the most reliable chemical which kills all types of the insects. This process is regarded as a major innovation that happened in the firm.

The study also found that, Vector Health International has R&D department. This department is responsible for ensuring quality of the nets and conduct research on the kind of the new materials used to produce nets. For this reason the firm is capable in implementing radical innovation, the firm is currently building a research center for testing new products, especially insecticides treated materials, for crop protection and vector control

The workers in R&D are the experts from Japan and Tanzania. The Tanzania experts were trained by the Japanese within the firm, implying that the firm has potential for technology transfer to Tanzanians.

4:3:3 Training Programs in EPZ Tanzania

Training in human resource is another component in EPZ. Workers in the Zones are expected to be imparted with new technologies and entrepreneurial skills that can be transferred to local firms by workers. Training of such new technologies can have two levels. Level one is in-house, which is training during the working hours. Level two is off the job training, that is, study and experimentation in the class room for workers. However, the most important in this study is the training duration. This is to measure the number of days allocated to teach the desired knowledge and skills for the workers.

Table 8: Training Duration

No	Category	N=25	Percent
1	One week	3	12
2	Two weeks	9	36
4	One month	4	16
5	Two month and above	1	4
6	No training	8	32

Source: Survey data, 2012

It was found that out of the EPZ firms surveyed, 3 (12%) trained their workers for a week. 9 (36%) for two weeks, 4 (16%) for one month, 1(4%) two month and above and 8 (32) never conducted training for their workers. These results depict that training in EPZ firms is of very short time duration and the plan was to give workers prior knowledge about the work. Apart from that, some firms never conduct training.

Training is another aspect of technology transfer. In this study it was found that training in EPZ firms are on job training which cover a short time. Most workers receive training from foreign experts for two weeks to one month. These kinds of training show that there was no indication of technology transfer because of the limited time.

In other countries, technology transfer from EPZ to the local firms occurred largely through training of workers (*http: sites.tufts.edu*). For example, in Thailand (Krabang EPZ) there is 3-month on the job training for workers and off the job training which involve study and experimentation in classroom and laboratory for workers; Oversees training (at parent company) in management and technology. In China, 3-month on the job training, 1 month for class and 2 months for production practices (Takoyish & Zafris, 1998). This shows that the training time located enables workers to develop expertise in a particular group of techniques or technology.

Table 9: Oversees Training Programs

No	Category	N= 25	Percent
1	Yes	4	16
2	No	21	84

Source: Survey data, 2012

It was found that out of the EPZ firms surveyed, 4 (16%) had oversees training program for their workers. On the other hand, 21 (84) had no oversees training program. This means investors in EPZ are not interested in sending their employees to parent companies abroad, especially in management and technology. In other countries such as Thailand there are oversee training programs for workers (at parent company) in management and technology (Takoyish & Zafris, 1998). This program provides the room for workers to strength their expertise in particular field of technology.

4:3:4 R&D Department

This is the specialized unit (Lab) belonging to the firm responsible for creating new products, improve the existing products. Also, it is for research conducting such as sample testing and to develop the new formulas for certain products. In this area the local experts get particular training of skills and techniques.

Table 10: R&D Department

No	Category	N=23	Percent
1	Yes	2	8
2	No	23	92

Source: Survey data, 2012

The study found that only 2 (8%) of the surveyed firms had R&D departments. On the other hand, 23 (92%) had no R&D. This implies that majority of EPZ firms have no R&D department as means of conducting research for new products or problem solving.

During field work, it was noted that majority of firms operating in EPZ Tanzania are the subsidiary of multinational cooperation located abroad. During the interview with investors, it was noted that R&D departments are found in parent companies. This means that all technological activities like testing of the new materials, development of the new samples and formula are not done in the zones but in main companies. However, in so long as most functions located in Tanzania are low tech, R&D is not really needed. Van Cited in Mwaigomole (2009) points out that subsidiary firms found in EPZ are not enthusiastic enough to affect technology transfer, since R&D and other technology intensive activities are carried out in parent companies. Warr (1989) adds that, foreign companies in the most EPZ ensure that research activities are retained at parent companies because they want to protect their technology. Amaria (2002) argued that

substantial amount of technology are yet to be transferred internationally from parent companies to their subsidiaries located in EPZ. The kind of technology which is transferred is essentially a production technology of simple nature.

During the interview with the EPZA staff dealing with investors, it was noted that EPZA had no agency required to diffuse and adopt the technology used by EPZ firms. Also, EPZA had no prior knowledge about importance of the firms operating in EPZ to be, to some extent technology intensive and therefore needing R&D departments. One respondent reported that that EPZA had never told investors the issues related to R&D and the program have never been considered. In other countries, the agencies required to diffuse technology from EPZ firms have developed. For example, Malaysia established Skills Development Center as an institution that acts as technological watch for diffusion and adoption of foreign technology from EPZ to local firms (Omar and Stoeber, 2008). In the same vein, Makood (2004) adds that, Mauritius has managed to extract technology from EPZ by building Skills institutions such as EPZDA and MIDA.

4:3:5 Quality Control Department

This is a special section in the firms responsible for inspecting all activities carried out by the firm. The section emphasizes on testing of products to identify defects and report to the management. In other words, it is a section where quality assurance of the products produced takes place.

Table 11: Quality Control Departments

No	Category	N= 25	Percent
1	Yes	13	52
2	No	12	48

Source: Survey data, 2012

The study found that 13 (52%) of the surveyed firms had quality control departments. On the other hand, 12 (48%) had no quality control departments. This means that half of the surveyed firms had capability of making sure that the used raw materials and products produced are good for customers.

During the interview with investors, it was noted that the quality control sections found in some firms were used to validate the raw materials used to produce certain products, inspection of products before exportation, improvement of the produced products, grading and cleaning products before exportation.

4:3:6 Foreign Experts

These are employees from other countries working in EPZ firms with an expertise in a particular group of techniques or technology. Their activities are to supervise production, conduct research and maintenance of the machines used by the firms.

Table 12: Foreign Experts

No	Category	N= 25	Percent
1	0	1	4
2	1-5	19	76
3	6-10	5	20

Source: Survey data, 2012

It was found that out of the EPZ firms surveyed 1 (4%) had no foreign experts, 19 (76%) had five or less foreign experts, 5 (20%) had between six to ten foreign experts. These

results showed that most EPZ firms in Tanzania had five or less foreign experts. Few had more than five foreign experts. During the interview with EPZA staffs dealing with investors, it was noted that EPZA policy does not allow a firm to have more than five foreign experts.

During the interview with investors, it was noted that some of the EPZ foreign experts were found performing administrative activities, other supervising production and train local workers. However, most foreign experts were directors and firm bosses. It is suggested that, foreign experts are valuable in training the local people. However, the number of expatriates employed in Tanzania EPZ firms is small. Most of them are coming from the countries where the parent companies are found such as India, Pakistan and China.

4.4 Relationship between Firms in EPZ and those outside the Zones

This section examines various relationships between firms in EPZ and those outside the zones. The aim is to establish the linkages that exist between EPZ firms and those outside the zones. In other words, the study aims at finding possibility of technology transfer from EPZ firms to those outside the zone. The links transfer technology to those firms outside the zones.

4:4:1 Direct Relationships between EPZ Firms and those Outside

These are the agreements between EPZ firms and those outside the zone in the operation of business. These include, cooperative research programs, licensing agreement, co-production agreement, cooperative training programs, sub- contracting to local firms and

raw materials supply by local firms to EPZ firms. These links transfer technology from EPZ firms to those outside the zones.

Table 14: Direct Relationships

No	Category	N=25	Percent
1	No direct relation	16	64
2	Purchasing of raw materials	4	16
3	Packaging materials purchasing	5	20

Source: Survey data, 2012

The study assessed the direct relationship between EPZ firms and those outside. It was found that 16 (64%) of EPZ firms surveyed had no direct relation with those outside the zone, in terms of joint venture research programs, licensing agreement, engineering and design construction, co- production agreement, local firms sub-contracting. However, it was found that, 4 (16%) source raw materials from the local firms and 5 (20%) source packaging materials from local firms.

Findings revealed that very few EPZ firms had linkages with those outside the zone. However, the linkages are in terms of raw materials supply and packaging. Firms outside the zones are yet to get sub-contract from EPZ firms. The field study founds that, most EPZ firms have been importing the locally available materials such as millet, groundnuts and cotton. However, during the interview, EPZ investors said that the kind of species required is not found in Tanzania. Second was the lack of information to connect EPZ investors with the local suppliers of raw materials and thirdly was that raw materials available locally do not meet the quality standard required. During the interview with EPZA staff dealing with investors, it was revealed that the policy that forces investors to

buy locally available materials is not strong as it is supposed to be. Therefore, the study found that the linkages between EPZ investment and domestic economy were weak.

In some countries, the linkages between EPZ firms and local economies have been strengthened. For example, in Korea, the government ordered investors to buy the raw materials from local companies and give the local companies technical assistance so as supply quality standard of the materials required (Larry, 1996). Likewise, in Taiwan, under government guidance, personnel from EPZ were placed at potential local suppliers to offer advice in quality control (Takoyoshi and Zafris, 1998). Jayanthakumarn (2002) adds that in the situation where EPZ firms purchase local raw materials or goods, such links transfer technology to domestic firms. He found that, in Indonesia, garments firms in EPZ transfer technology to local firms by purchasing the locally made textiles.

According to Jayanthakumarn (2003), domestic firms are expected to access technical know how (Technology) through the process of sub- contracting. However, it was found that sub-contracting agreement were between Tanzania EPZ firms themselves. This means that firms in Tanzania EPZ have linked among themselves. During the interview with EPZ investors, it was found that, EPZ firms were not linked with firms outside the zones due to some reasons. Firstly, EPZ firms have no direct contact with other local firms. Secondly, there is lack of firms that could supply the inputs needed by EPZ firms.

In other countries, the firms outside the zones get technology through the process of sub-contracting. For example, Jayanthakumarn (2003) find that EPZ firms in Indonesia have linked with local economy through sub-contracting. In Korea, evidence shows that the government was very successful in encouraging backward linkages with local firms. The

government ordered the zones administration to give sub- contract to local firms. This shows that in Korea and Indonesia, there is technology transfer since backward linkages between EPZ firms and those outside the zones exist. It can be argued that since most EPZ firms in Tanzania have no link with firms outside the zones and the government has no strategies to promote links, the transfer of technology is difficult.

4:4:2 Indirect Relationships between EPZ Firms and those Outside

These are the mechanisms that bring EPZ firms and those outside the zone together without an agreement. These include science and technology conference, Trade show and exhibits, commercial visits and movement of workers from EPZ firms to those outside the zones. These mechanisms facilitate the process of technology transfer from EPZ firms to those outside the zones. This is because investors in the firms outside the zones are exposed to investors in the EPZ. This provides them with opportunities of learning new technologies, entrepreneurial and organizational skills.

Table 15: Indirect Relationships

No	Category	N=25	Percent
1	Science and technology conferences	0	0
2	Trade shows and exhibitions	0	0
3	Commercial visits	0	0
4	Movement of workers	0	0

Source: Survey data, 2012

The study assessed indirect relationships that exist between EPZ firms and those outside. It was found that all EPZ firms surveyed had no trade shows and exhibitions, commercial visits and movement of workers. Also, EPZ firm never conducts science and technology conference with firms outside zones. Therefore, since most of the firms in Tanzania EPZ

conduct their business without close relationship with firms outside the zones and the government has no strategies to promote links, technology or skills transfer is difficult.

4:4:3 Relationships between EPZ Firms and Higher Learning Institutions

These are close contacts that exist between EPZ firms and the Higher learning institutions. These include some cooperative training programs between the enterprises in EPZ and school/college. These programs leave technical training to be provided in factory. This provides the room for students to acquire skills and knowledge.

Table 16: Relation with Higher Learning Institutions

No	Category	N=25	Percent
1	Yes	5	20
2	No	20	80

Source, Survey data, 2012

It was found that 5 (20%) of the EPZ firms surveyed had relationships with the higher learning institutions. On the other hand, 20 (80%) had no relationship with the higher learning institutions. This means that most of the EPZ firms have no cooperation with the higher learning institution. Few firms had cooperation with the universities, mainly in the fields of students training, advice, sample testing, and hiring of industrial engineers and technicians.

This shows that, in so long as few firms have contact with higher learning institutions, there is no possibility of diffusing the technology found in EPZ firms to local R&D. In other countries such as Taiwan, some cooperative training programs between colleges and the enterprises in the EPZ have been developed. These programs leave technical

training to be provided at the factory rather than in the institution (Takoyosh & Zafris, 1998).

4:4:4 Relations with External R&D Institutions

These are close contacts that exist between EPZ firms and external R&D institutions. It is sometimes called “external knowledge sourcing”. These include cooperative research programs such as conducting sample testing, develop formula for certain products and training for specific projects needed by EPZ firms.

Table 17: Relation with External R&D Institutions

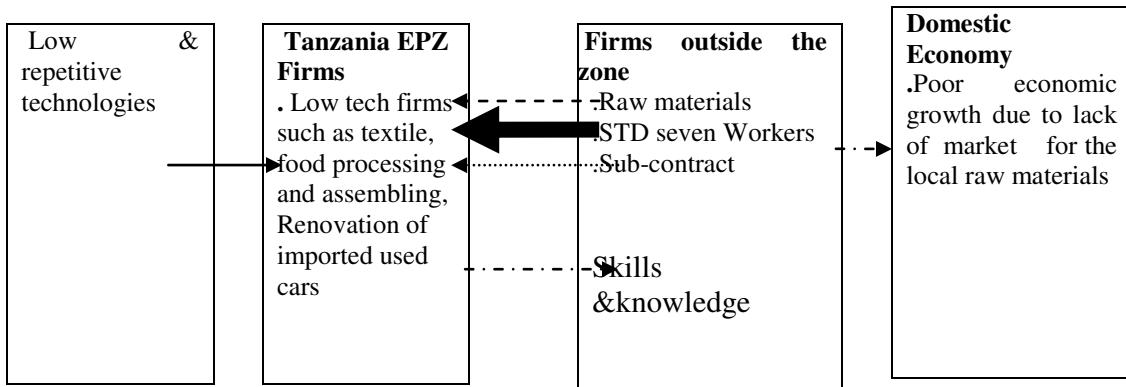
No	Category	N= 25	Percent
1	Yes	6	24
2	No	19	76

Source: Survey data, 2012

It was found that 6 (24%) of the EPZ firms surveyed had relationships with external R&D institutions. Additionally, 19 (76%) had no relationship with external R&D institutions. This means most of the EPZ firms never interact with external R&D institutions as means of knowledge sourcing. However, most firms have contact with the R&D found in parent company abroad. All activities are done in these R&D. The subsidiary companies operated in Tanzania EPZ deals with production only.

Moreover, EPZ firms which are not a subsidiary of Multinational Corporations are the ones which cooperate with external R&D for technology out sourcing. For example, one EPZ firm was found active relaying on an R&D found in German for sample testing. Others were relaying on R&Ds found in Holland for soil testing and others in Japan for chemical testing.

Figure 2: Findings of Tanzania EPZ Firms



Source: Researcher, 2012

Note: ← Strong link
 ← Weak and non-existent link
 ← Few links but weak
 → No link

The model provides the summary of the characteristics of Tanzania EPZ firms. It shows that investors with low and repetitious technology linked with Tanzania EPZ. As a result, low tech firms have been established. These include assembling, renovation of imported used cars, textile and food processing. However, Standard Seven leavers are the most preferred workers. A few established EPZ firms use the locally available raw materials. There is no subcontracting to the local firms. Therefore, technology transfers from EPZ firms to those outside the zones have been difficult. In summary, EPZ firms in Tanzania do not show the signs of skilled labor development and transfer of new technologies to firms outside the zones.

4:4:5 Problems Facing EPZ Firms in Tanzania

This section focuses on the problems facing EPZ firms in Tanzania. The owners of EPZ firms were asked to state the most serious difficulties they were facing in doing business in the zones. It was found that there were many constraints. However, power shortage, lack of raw materials, poor environment, and problems related to taxation process were the most typical.

Table 18: Problems Facing EPZ Firms in Tanzania

No	Category	N=25	Percent
1	Power Shortage	7	28
2	Problems related to taxation process	6	24
3	Poor environment	6	24
4	Lack of raw materials	5	20
5	Others	1	4

Source, Survey data, 2012

Data showed that of the EPZ firms surveyed, 7 (28%) investors said that the most serious problem that facing their firms was shortage of power. 6 (24%) said problem related to taxation process, 6 (24%) poor environment. 5 (20%) said there was lack of raw materials and others 1 (4%). Therefore, the most serious difficulties facing EPZ firms in Tanzania are shortage of power, lack of raw materials, poor operating environment and problems related to taxation process. Other problems were lack of trained personnel and market size.

The study found that power shortage was the most difficult problem facing EPZ firms in Tanzania. It was observed that EPZ firms in Tanzania had no enough power supply. Most of them depended on plants supplying power to citizens. As a result, when there was power allocation, EPZ firms were the victims. During the interview with EPZ investors, some argued that electricity cut off hindered from performing their industrial activities effectively. As a result, production became low. Further, investors are forced to use generators. As a result, production costs were higher. Other investors reported that, sometimes, if there was no power, they just closed the firms for some hours or days. To support this observation, one respondent was quoted saying;

My dear friend; in order to operate a firm, a constant supply of power is required. If you don't have an access to enough power, you can't think about producing more products for export. Also, using a generator which would help me in doing my activities will not smoother production as it could be done by electricity.

It is suggested from the quotation that power shortage hindered production activities in the Tanzania EPZ firms. As a result, most of the EPZ firms could not produce more products for export. The results show that power access ability was important for EPZ firms as it helps investors to produce more products to be exported to external customers.

The problem associated with taxation process at TRA was the second problem. The study found that TRA officials were not aware of tax exemptions offered to EPZ firms in Tanzania. Also, most of the TRA officers had no general knowledge about EPZ operation. Clearing agents take long time. As a result, there is delay of imports and

exports at the port. This problem hinders effective production in the firm. One investor claimed that importation of raw materials can take one month at the port. Investors also, claimed that the problem persists at borders.

During the interview with EPZA staff dealing with investors, it was revealed that TRA did not agree with the incentives offered to EPZ operators such as tax holidays and tax exemption. Also, TRA officers were refusing to inspect EPZ imports at the center of destination as it is supposed to be. This shows that there is misunderstanding between EPZA and TRA officials. This problem has caused many investors to run away from EPZ. For example, one EPZA staff pointed that Mount Meru Miller's limited had conflicts with TRA officials. TRA officials claimed that the firm was a tax evader. As a result, the firm was supposed to pay over one billion to TRA. The firm decided to get out from the Zone.

It was also revealed that measures have been taken to educate TRA officials on the operators of EPZ firms. Workshops were being prepared. However, TRA officials, especially the seniors, never attended the workshop. As a result, TRA officers maintain their solidarity of being strong and effective in tax collection. EPZA staffs pointed out that in Kenya, the problem is non-existent. As such, Kenya revenues agree with the incentives offered to EPZ firms.

Poor environment also hinder smooth operation of EPZ firms. Investors claimed that the zones are not good as they are supposed to be. For example, investors at Hifadhi Zone claimed that the area had no security. The cameras were not working. As a result, thieves came in and stole investor's properties. In the same area, investors claimed that there was only one toilet which could cause health problems to them. Also, investors said that water

supply was a problem. During field, some investors were getting out of the zone. Investors claimed that it was impossible for them to run their firms in an area with no water.

Moreover, the study revealed that lack of raw materials was a problem. The study indicated that lack of required raw materials discouraged investors to cooperate with the local firms. Investors preferred imported raw materials. The fact was that imported raw materials were more attractive than the locally available. The advanced technologies involved in imported raw materials provided them with the standard required over the locally available ones. Therefore, EPZ investors considered the locally available raw materials as of poor quality caused by low technology. These situations of importing raw materials from other countries limit backward linkages.

In addition, investors prefer importing raw materials because they lacked the information on the available raw materials in Tanzania. Others claimed that varieties/specific materials required by the firms were not found in Tanzania. Most of these varieties are found abroad. As such, textile firms have been importing raw materials such as cotton from Egypt and Mauritius. Also, it was found that food processing firms have been importing such raw materials as sugar, milk and ground nuts from South Africa and Uganda.

It was also found that EPZ firms depending much on the locally available materials were not doing well in production. For example, it was found that a cashew nut firm was not operating because farmers were incapable of feeding the firm. As a result, investors

stopped production until harvesting seasons. This means that the local people are not prepared to supply raw materials all the time to the EPZ firms.

Other problems such as lack of trained personnel, market size and lack of trade fair to attract different countries were least mentioned. However, in so far as of training was concerned, investors claimed that workers were illiterates. Most of them are standard seven with no skills. They also reported that, market size was becoming small as the expansion of East Africa Community to Rwanda and Burundi. This is because EPZA does not count export products within the community.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, conclusion and recommendations.

5.2 Summary

The specific objective one identified characteristics of EPZ firms in Tanzania. The study has revealed that most EPZ firms found in Tanzania are of low tech sectors, dealing with assembling, and renovation of imported used cars, food processing and manufacturing of textiles products. Their technological capability levels are basic and intermediate. Moreover, most EPZ firms in Tanzania have no R&D department. Also, workers' training takes a short time.

The specific objective two determined the relationship between firms in EPZ and those outside the zones. The study has found that most EPZ firms conduct their business without links with those outside the zones. In other words, the backward linkages between EPZ firms in Tanzania and those outside the zones are non-existent.

The specific objective three identified the difficulties that EPZ firms in Tanzania were facing. The study has shown that the firms are experiencing four types of problems, as presented below

- (1) Power shortage
- (2) Problem related to taxation process

(3) Poor environment

(4) Lack of raw materials

5.3 Overall Conclusion

This study has found that:

EPZ firms in Tanzania seem to have no ability in promoting technology transfer to firms outside the zones. This is evidenced by findings which have revealed that most EPZ firms belong to low tech sectors. Only one EPZ firm has advanced level of technological capability. Most of them have unskilled labor intensive with no R&D department. The interviews conducted to EPZA staff showed that high tech firms are not found because of two reasons; lack of indigenous scientists and technician employees in these firms and lack of good physical infrastructure such as roads, airports, ports and railway line to facilitate exportation of goods from the zones to other countries.

In addition, this study has further showed that there are very few linkages between Tanzania EPZ firms and those outside the Zones. Also, the government of Tanzania has no strategies to promote the links; thus the transfer of technology from Tanzania EPZ firms to those outside the zones is difficult.

The power shortage, problem related to taxation process, poor environment and lack of raw materials are the factors that hinder smooth operation of EPZ firms in Tanzania. Among these factors, power shortage is the most serious problem. During the interview with investors, it was revealed that the Zones are affected by power allocation from TANESCO; as a result investors depend on the generators in running the firms.

5.4 Recommendations

Recommendation for practice, policy and academic purposes are offered in light of the findings of this study. To the policy makers, the following recommendations are made:

- Technological infrastructures of the zones need improvements so as to attract
Medium and high tech firms
- EPZ policy should focus on intermediate and advanced firms.
- Strengthening the linkages between EPZ firms and those outside the zone

5.5 Areas for Further Research

From the standpoint of academic scholarship, two particular lessons stand out from the study as basis for further research as follows:

- I. The need for a similar research to be conducted in the next five years.
- II. The study can be conducted in one of the East African Countries for comparison

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QUESTIONNAIRE FOR ASSESSING EPZ FIRMS IN TANZANIA

Section A. Profile of the Firm

1. (A) Name of the firm..... Date.....

(b) Address..... (c) City.....Location.....

(d)Age of the firm.....

2. Ownership of the Firms

() Foreign owned firms () Joint Venture between government and Foreign Firm () Joint Venture between local and foreign firms () local owned firm () joint venture between foreign

3. Origin of the Firm

() Branch of the firm located abroad

() Completely new business

() Other

4. Number of workers working in the firm.....

5. Education level of the workers

() Standard Seven; how many.....

() Vocational Schools; how many.....

() Secondary education; how many.....

() Technical Schools; how many.....

() University; how many.....

Section B: Characteristics of Tanzania EPZ Firms

6. Kind of the Firm

() Textile and garments

() Agro-processing

() Leather and leather products

() Lapidary

() Electrical and electrical appliance

- () Information and Communication Technology (ICT) industries
- () Assemblage Firms
- () Others, state.....

7. Technology investment

- () Basic Investment

Products	Processes
A=Replicate designs	A=Assemble components and final goods
B=Introduce minor innovation to the product	B=Introduce minor changes to process technology

- () Intermediate Investment

Products	Process
A=Introduce new designs for manufacturing	A=Manufacture components
B=Develop new prototype	B=Introduce automation process
C=Maintain quality control	

- () Advanced investment/High-tech industries

Products	Processes
A=R&D activities	A= Perform own designing manufacturing
B=Development of entirely new products	B=Introduce major improvements to the machine
C= Conduct research on new materials and products	C=Develop new equipment

8. Can you explain the training programs for your workers...?

- () Mostly in house training duration.....
- () Mostly off house training..... duration....
- () Both in house and off house training

9. Do you have an over see training programs? (Yes) () no

10 If yes, explain.....

10. Does the firm have R&D department? YES/NO

11. If, yes to No 9 above, explain the function of this R&D.....

.....
12 Do you have design and quality control departments? Yes () No

13 If yes, explain.....

14. Do you have Foreign Experts....?

15 If yes how many? and what are their roles.....?

Section C: Relationships between Firms in EPZs and those Outside

16. Who supply your firm with raw materials?

- Local firms only
- Local firms and external suppliers
- External suppliers only
- other

17. What are direct relationships between your firm and local firms?

- Joint venture cooperative research programs
- Licensing agreement in production
- Engineering design and plant construction
- Co-production agreement
- Training for specific production projects
- Provide technical assistance to local firms
- Sub- contract to local firms for the projects

18. What are indirect relationships between your firm and local firms?

- Exchange of scientific and technical personnel
- Science and technology conferences
- Trade shows and exhibits
- Commercial visits
- Local firms hire workers from your firms
- Reverse engineering

19 Do you have any ongoing relationship with the Higher learning institutions? Yes () No

20 If yes explain.....

21 Is there any relationship between your firm and External R&D institutions? Yes () No

22 If yes, explain.....

APPENDIX C

INTERVIEW GUIDE FOR THE EPZA STAFF

- 1) How many EPZ firms do you have?
- 2) What is their status?
- 3) Do you have an agency required to diffuse technology from EPZ firms?
- 4) Have you developed the link between EPZ firms and those outside?
- 5) Have you developed a link between EPZ firms and the higher learning institution?
- 6) Are you aware of the difficulties facing EPZ firms?