

MASTER

Privatisation at Tanzania Harbours Authority : case study grain terminal

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**PRIVATISATION AT
TANZANIA HARBOURS AUTHORITY**

CASE STUDY: GRAIN TERMINAL

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M.Sc. thesis

October 1996

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PREFACE

In the mornings I used to walk to the office with Kimaro. We were late and had much to talk about. The part of the Kilwa Road from the house to the office was too short. Each morning we slowed down our pace when the cross road where we would part, approached. We tried to complete the conversation, but each morning we failed. After a while, we finished the conversation artificially, promising each other to continue it later that day. But only the next morning we remembered the importance of the subject...

Thanks to Kimaro and his *ndugu* (relatives), my stay in Dar es Salaam became so very special. They gave me the chance to live among Tanzanians, with all the inconveniences of the non-luxurious life Tanzanians live. *And* with all the valuable experiences I would never have taken part in, without becoming *ndugu* of these people. All members of this family made my stay unforgettable and I think back with melancholy about them.

Other people I would like to thank are Florence Nkya, my field supervisor, and Moshi Mtambalika. Both ladies became good friends during my stay, with whom I spent many, but not enough, hours. To all the other people of the planning department I am grateful, but I want to mention one special woman in particular: Mrs. Abdallah, whose loud laughter could be heard all over the department.

In the Netherlands Mr. Hanekamp and Mr. Seignette should be complimented for their help and interest in my thesis. From the staff of Technology Development Sciences at the Eindhoven University of Technology I owe Paul Lapperre a word of appreciation for his patience and suggestions during the writing of this report, although I have to mention that he regularly promised to break my neck. Fortunately I learned fast, so I got the chance to finish this thesis. Mr. Gaillard I want to thank for his guidance and relativating eye winks.

A very special Dutch friend in Tanzania has not been mentioned yet: Jan-Peter. I owe him as much as I owe the Kimaro-family. The words *Waarom, zeg mij waarom...* (from the song *My way*, translated by Mr. Hazes) nostalgia and sweet memories.

Last but not least, I want to express gratitude to all friends who sent me mail. Everyone who has stayed abroad for a longer time, will understand how heartwarming it is to receive a message from 'home'.

this report is dedicated to Amabel and Amber

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INTRODUCTION

Within the faculty of Technology Management at the Eindhoven University of Technology, the research group Technology Development Sciences is undertaking research activities in Tanzania, which give insight in the industrialisation process. This M.Sc thesis, which focuses on the privatisation of Tanzania Harbours Authority (THA), fits in the faculty's research activities. The research is a case study of the privatisation of a part of the port in Dar es Salaam, the grain terminal.

The first chapter is a theoretical frame work, in which the problem setting is described. General information about Tanzania, THA and the port in Dar es Salaam can be found in this chapter. Then two research questions are formulated:

1. *Through what form of joint venture can the THA-grain terminal best be privatised in view of the government's aims?*
2. *How can the cargo throughput of the THA-grain terminal be improved?*

Chapter two deals with the first question. The aims of all organisations involved in the privatisation are described. Then a the division of responsibilities for a new joint venture is proposed. This proposed joint venture is checked against the government aims.

Chapter three deals with the improvement of the cargo throughput. By comparison with the bench mark organisation, the differences and similarities become clear. A logistical theory was used to detect and remedy the operational constraints. The cultural constraints are dealt with in the last paragraph of this chapter.

The fourth chapter consists of an executive summary, conclusions and recommendations.

CHAPTER I THEORETICAL FRAME WORK

1.1 PROBLEM SETTING

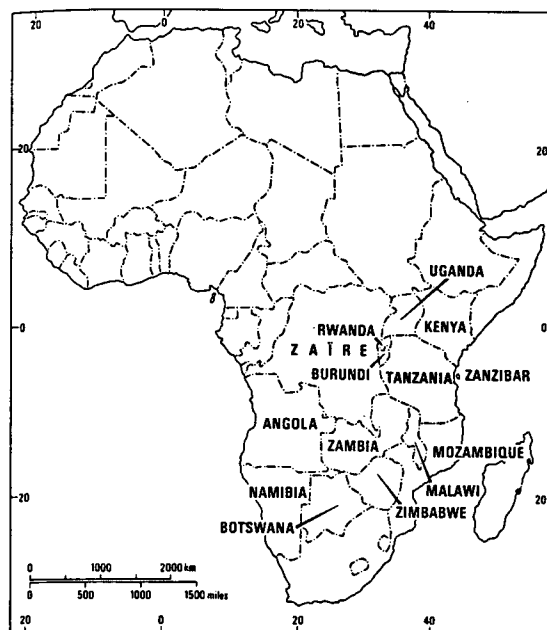
Tanzania

General characteristics

Tanzania, officially the United Republic of Tanzania, is an East African country lying immediately south of the equator, covering an area of 935 thousand square kilometer. Dar es Salaam is the largest city and the seat of government, pending the transfer of official functions to the new capital at Dodoma. Facing the Indian Ocean on the east, Tanzania is bordered by Malawi and Mozambique in the south, Zambia and Zaire, Burundi and Rwanda in the west and Uganda and Kenya in the north. The outlying territories comprise the islands of Zanzibar, Pemba and Mafia. In 1994, the population was estimated at 27.3 million with a doubling time of 27 years. The main religions are Islam, Animism and Christianity. In 1995 those three entailed respectively 35%, 35% and 30% of the population.¹ Figure 1.1 presents the position of Tanzania in Africa.

Figure 1.1

Tanzania in Africa



Economy

Since Tanzania's independence in 1961, the country followed a socialist development strategy, based on egalitarianism and self-reliance. This was all stated in the Arusha Declaration, passed in February 1967. During the first decade of independence the country was fairly successful in meeting basic human needs and achieving economic growth. But in the 1970s the economic performance weakened and in the 1980s the country found itself in an economic crisis. In 1982 the government launched a

¹ Encyclopaedia Britannica, *Britannica World Data Annual 1995* (Chicago: Britannica Inc., 1996)

Structural Adjustment Programme (SAP), which covered a three year-period (1983-85) and which was meant to improve public sector finances, reduce inflation and improve external and internal balances. Efforts to raise the production of both industry and agriculture were made by giving incentives. The SAP resulted in a smaller economic growth than predicted, which was mainly due to lack of foreign currency which limited the country's import capacity. In July 1986 an extension of the SAP was adopted, the Economic Recovery Programme and this resulted in agreements with the International Monetary Fund and the World Bank in 1989. The chronic balance of payments crisis, the economic recession and pressure from the International Monetary Fund and aid donors were the stimula for the changes to a more liberal policy.

According to the World Bank classification, Tanzania is in the group of "low-income economies". Ranking these countries in ascending order of GDP per capita, Tanzania becomes second, based on the 1992 data. The GDP per capita was US\$ 110 in 1992, with an average annual growth rate of 0.0% over the period 1980-1992. These are low in comparison to the averages for all low income countries (excluding China and India), which are US\$ 370 and 1.2 percent respectively.²

Before the liberalisation started, the economy of Tanzania was based largely on agriculture and it still is. Cultivated land is extremely limited although the agricultural sector accounts for more than one-half of the GDP and employs more than four-fifths of the work force. Production fluctuates considerably, with serious shortfalls occurring largely as a result of drought and shortages of fuels and machinery.

Total imports in 1993 amounted more than trice the value of total exports.³ Machinery and transport equipment, basic manufactures and fuel belong to the most important import goods, while coffee, cotton and sisal are the main export goods. Tanzania suffers from a serious lack of foreign exchange. Chief trading partners include the United Kingdom, Germany, the Netherlands, Japan and Italy.

Infrastructure

Because of the immense size of Tanzania and its widely scattered population, transport in general plays an important role. The transport infrastructure is very important for the social and economical development of the country. In the past, the need to offer landlocked countries an access to a major seaport existed. This all gives an additional dimension to the planning, development and operation of transport services in the country. The transport infrastructure comprises a road network of some 55,000 kilometers, two railway systems, two international and twenty minor airports, an oil pipeline between Dar es Salaam and Ndola in Zambia and three main ocean ports (Dar es Salaam, Tanga and Mtwara).⁴ The main port in Dar es Salaam is very important for Tanzania's import and export as almost all intercontinental import and export is done via the port, which is assumed to be about 85%. The remaining imports and exports are done via road and rail connections. The landlocked countries such as Zambia, Zaire, Burundi, Rwanda and Malawi are also significant users of the Dar es Salaam port for foreign trade.

Tanzania Harbours Authority

Tanzanian harbours

With the collapse of the East African Community in 1977, the government of Tanzania established the Tanzania Harbours Authority (THA) by legislation. THA was made responsible to develop, improve, maintain, operate and regulate the harbours of Tanzania and also to construct and operate new ports as

² The World Bank, *World Development Report 1994; Infrastructure for development* (Washington: The World Bank, 1994, p.126)

³ Encyclopaedia Britannica, *Britannica book of the year 1995* (Chicago: Britannica Inc., 1996, p.727)

⁴ Koenders, P., *Development of a traffic planning system at Tanzania Railways Corporation (TRC); effects of liberalization policies on Tanzania Railways Corporation* (Eindhoven: Eindhoven University of Technology, 1994, p. 4)

and when required. THA is responsible for the three major ocean ports situated in Dar es Salaam, Tanga and Mtwara. The three ports function as separate administrative and operational units, managed by port managers, under the supervision of the Director General of THA. Tanga and Mtwara handle a limited tonnage, most traffic (90 to 95%) is handled by Dar es Salaam port.⁵ Seaships as well as coasters are handled and the ports do serve Tanzania as well as it's neighbouring countries. The Tanzanian ports are meant for cargo throughput mainly, no value adding activities are known, but the bagging of grain, sugar and fertiliser. Those commodities are within THA known as free flowing commodities, but from now they will be called dry bulk. In appendix A-1, a part of an article is copied in which the historical perspectives of port development in East Africa and the rise of the modern East African port system are described.

The role of Tanzania Harbours Authority

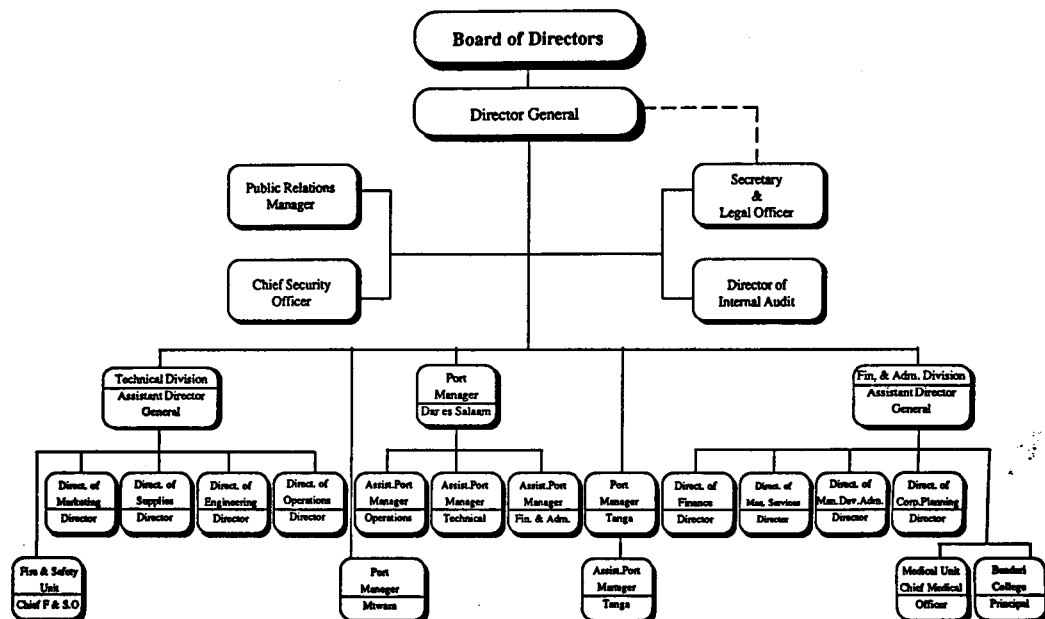
Until now Tanzania Harbours Authority (THA) has been a parastatal enterprise. Since the liberalisation process in Tanzania started, pressure has increased to commercialise and privatise (sections of) THA. In 1993 the Presidential Parastatal Sector Reform Commission was founded with the aim to determine precisely how the process will proceed and how to overcome practical problems that all parastatal reform programmes must face.

Organogram THA

The organisation structure of THA is shown in figure 1.2. THA is the sheltering organisation which sets out a policy and the headquarters is situated in Dar es Salaam, adjacent to the port.

Figure 1.2

Organisation structure Tanzania Harbours Authority



⁵ Tanzania Harbours Authority, *Annual Reports 1984 - 1993* (Dar es Salaam: THA, 1985-1995)

Imports and exports by THA are given in table 1.1.

Table 1.1

Import and exports of Tanzania by THA			
year	import (m tons)	export (m tons)	total (m tons)
1993/94	3.23	1.11	4.34
1992/93	3.84	1.29	5.13
1991/92	3.22	1.17	4.39
1990/92	2.93	1.22	4.15

Port of Dar es Salaam

The port of Dar es Salaam is a major regional port serving not only Tanzania but also the neighbouring landlocked countries. In 1990 the port throughput was the second largest of East Africa, after the port of Mombasa and the second largest earner of foreign exchange in Tanzania, after coffee.⁶ The port lies in a natural bay and the narrow entrance channel has a minimum water depth at low tide of about 7m. With the existing pilotage rules, ships are only allowed to pass the entrance channel during daylight. As the present water depth in the channel is not deep enough, larger ships have to wait for the right tide to enter the port. The total delay faced on average varies between about six hours per transit for shallow draft vessels, increasing rapidly to about 15 hours for ships of 8.9 metres draft. A ship whose draft is greater than 8.9 metres would normally be scheduled to arrive at times of spring tides and delays would not be expected to increase beyond this.⁷ Currently the maximum draft of the vessels which can enter the port is 6.7 metres plus the height of the tide above chart date. The mean height of spring tides in Dar es Salaam is 3.2 metres, so the maximum vessel draft is about 10 metres.

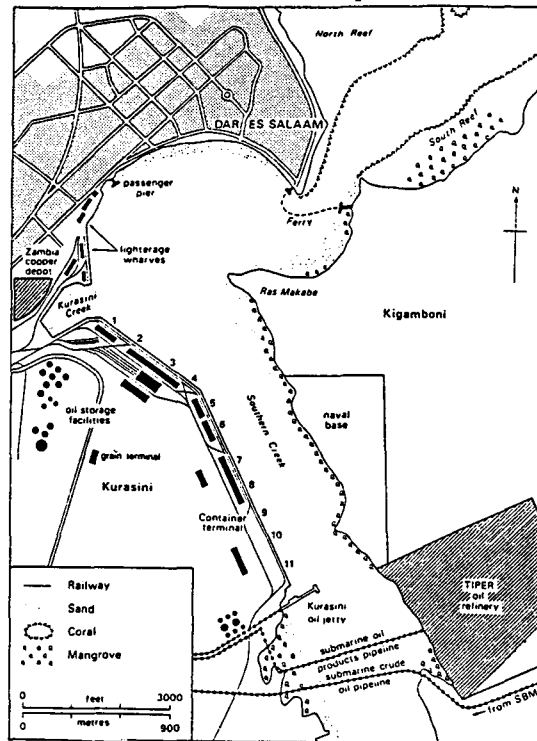
The port operates eight general cargo berths, three container berths, a petroleum products berth and an offshore single buoy mooring for crude oil imports. Figure 1.3 presents a map of the port in Dar es Salaam. The port is served by the two rail systems operating in Tanzania: the Tazara-line connects the harbour with the Tanzanian hinterland and with Zambia, Zaire, Zimbabwe and Malawi, while Tanzania Railways Corporation gives access to Burundi, Rwanda, Zaire and Uganda. Rail ferries operate across Lake Victoria. The Tanzam Highway connects Zambia and Zaire with Dar es Salaam. The road is currently in reasonable condition. The roads to Rwanda, Burundi and Uganda are in poor condition.

⁶ The World Bank, *Staff appraisal report: Tanzania port modernization project II*, (Washington: The World Bank, 1990, p.13)

⁷ S.L.I. consultants, *Dar es Salaam Port Development Study 1994-2004, Volume 4, Port characteristics and simulation*, (Vancouver: THA, 1994, p.1-2)

Figure 1.3

Dar es Salaam-port



Privatisation policy

At independence in 1961 the government introduced a policy of socialism and self reliance. In the Arusha Declaration, written in 1976, the development goal was described as rapid and self reliant economic growth through state control of the commanding heights of the economy. Numerous parastatal enterprises were established and this resulted in economic growth. But at the end of the 1970s the growth in the parastatal sector became negative and mid 1980s the sector even became loss making. As it was clear that previous policies had failed, the socialism policy was adjusted to a more liberal one. Commercialisation and privatisation of the parastatal sector became a point of focus and in 1992 the Presidential Parastatal Sector Reform Commission (PSRC) was founded to manage the implementation of policy in parastatal reform. The PSRC published a masterplan of reform for the parastatal sector, which was set in the context of the broader reforms which were introduced from the mid 1980s onwards.

The PSRC categorised all parastatals in three groups: social service institutions, public utilities and commercial enterprises. For each group a major strategy was developed which had to be detailed for each company.

Part of the current liberalisation policy in Tanzania is the commercialisation and privatisation of parastatal enterprises. Tanzania Harbours Authority is a parastatal which in future has to operate on a more commercial basis. At least parts of the organisation have to be privatised. The THA-management as well as the people from PSRC involved are especially interested in the privatisation of the Grain Terminal. The choice made by those two organisations is to privatise the Grain Terminal by creating a joint venture in which THA brings in the facilities and the partner knowledge and the management.

Goals of the research

The goals of the research is to recommend to THA the best possible joint venture structure to privatise the THA-grain terminal and the best possible ways to improve the cargo throughput of the THA-grain terminal.

1.2 RESEARCH QUESTIONS

Research question 1:

Through what form of joint venture can the THA-grain terminal best be privatised in view of the government's aims?

The sub questions are:

- What form of joint ventures are known and what are their characteristics?
- What are the aims of the THA-grain terminal joint venture in view of the government aims for privatisation?
- What are the existing laws and regulations in Tanzania with respect to joint ventures?
- What are the financial aspects relevant to joint ventures in Tanzania?
- What structures do exist for the settlements of disputes?

And as competitiveness between ports largely depends on the pace of cargo throughput, the other research question is:

Research question 2:

How can the cargo throughput of the THA-grain terminal be improved?

- How are dry bulk commodities handled in a bench mark organisation (Rotterdam Municipal Port Management)?
- How are dry bulk commodities in general and grain in particular handled at THA in Dar es Salaam?
- What are the performance indicators relevant to increasing the throughput of THA-grain terminal?
- What is the actual performance in relation to the indicators identified for THA-grain terminal?

Conceptual definitions

Commercialisation

An enterprise remains under state ownership, but the efficiency of the business is increased by measures. The ownership structure of public enterprises remains unchanged. Commercialisation is often a step preceding privatisation. It is often implemented in areas where it is difficult to attract private investors, or where full privatisation is not (yet) desired for other reasons. A further advantage lies in the relatively rapid implementation, and thus in the possibility for quick realisation of efficiency improvements.

In case of THA, commercialisation is defined as follows: *operation of port units by THA staff and management but with the introduction of aggressive bottom line management. THA's existing managers would have overall control over their operations including the power to select staff and workforce members and maintain equipment.*⁸ In THA's vision commercialisation should proceed immediately as a precursor to privatisation.

Privatisation

Transfer of former state assets to private owners, often with the intention to increase the company's efficiency and profits. In case of THA, with privatisation is meant operation of a port unit by a private contractor through a long term contractual arrangement with THA.⁹

⁸ S.L.I. consultants, *Dar es Salaam Port Development Study 1994 - 2004; Volume 3; Port operations and terminal management*, (Vancouver: THA, 1994, p. 8-2)

⁹ See footnote 8.

Joint venture

A shared ownership in a business or asset. It is very common to spread the responsibility, to make better use of available capacities and to diminish the risks. Joint ventures can be found in financing of all types of works and deliveries in all fields of activities. No clear joint venture-regulations do exist. Each joint venture has its own agreement with specific conditions describing the rights and duties of each partner. Like any other partner, the state can participate in any percentage of capital, according to its interests in management of the production or services.

Bench mark organisation

Ideal typical organisation. The Port of Rotterdam is chosen, as this port is known as one of the world's best.

Performance indicator

All facts regarding the situation of the transformation of inputs into outputs are situation variables. Measures can be done regarding three categories of process facts: inputs, situation variables and outputs, see also table 1.2.

Table 1.2

Process facts		
Inputs	Situation variables	Outputs
Materials	Stock level	Production
Costs	Run through time	Sale
Personnel	Speed of turnover	Delivery
Capacity	Loss of material	Turnover

Most variables can be expressed in both financial and physical units. To get insight in the performance achieved, the collected figures have to be related to norms of other figures. By connecting those figures, performance indicators are created. The situation variables are created by linking separated facts and are performance indicators themselves.

The most used performance indicators are:

efficiency:	norm input/ real input
effectivity:	real output/ norm output
process parameter:	real situation variable (key parameter)
productivity:	real output/ real input
occupation degree:	real input/ norm input

Efficiency is connected with the labour, time, costs and quantity of inputs used in the process set out to laid down standards. Effectivity is the realisation of the laid down standards measured in output. Process parameters give a value of performance indicators and productivity is the relation between the output and the input used to reach this output. Productivity is the output created by the input. The occupation degree of a capacity is the time a machine is the relation between the time a capacity was used and the time the capacity was available.

A performance indicator can be used to measure and compare the efficiency of various aspects of the port's operation. A set of performance indicators should provide insight to the management into the operation of key areas and, therefore, they should be easy to calculate and simple to understand. Performance indicators can be used to compare the real performance with the target and to detect a

trend in the performance. As a port authority deals with the overall responsibility for the functioning of the port, a well-balanced set of performance indicators will help to collect the right data instead of collecting a lot of superfluous ones.

Capacity

Available production time, so total time without maintenance, disruptions etc.

Bottle neck

A bottle neck is a capacity resource with a capacity which is smaller than or equal to the capacity demand.

Non-bottle neck

A non-bottle neck is a capacity resource with a larger capacity than the capacity demand.

Relevance of research

The first part of the research aims at design for the joint venture between the THA-grain terminal and the private investor. The methodology to design this joint venture might be useful for other joint venture-projects within THA in the future. The second part of the research will end in suggestions how to improve the cargo throughput of the grain terminal. The relevance for THA-grain terminal management is clear and the advice might also be of use for other terminals.

1.3 METHODOLOGY

The methodology to design an ideal joint venture consists of:

- literature study on joint ventures, on documents within THA concerning commercialisation and privatisation and on the grain terminal
- interviews, both structured and unstructured
- observation, both structured and unstructured
- analysis of gathered information
- design of organisation joint venture

The methodology to improve the cargo throughput of the THA-grain terminal consists of:

- visit benchmark organisation for empirical and literature study handling dry bulk commodities
- literature study and empirical study regarding ship handling dry bulk commodities at Dar es Salaam-port
- literature study government aims privatisation
- literature study financial aspects joint ventures in Tanzania
- literature study settlement of disputes
- analysis of gathered information
- analysis and operation of UNCTAD-performance indicators
- literature study of logistical theories
- application of theory of constraints and design of improvements
- literature study regarding culture differences
- advice regarding culture differences

CHAPTER II PRIVATISING THA-GRAIN TERMINAL BY MEANS OF A JOINT VENTURE

To find the best way of privatising the THA-grain terminal, the government policies regarding privatisation in general and of THA in particular are set out. As the Parastatal Sector Reform Commission decided that the grain terminal has to be privatised by means of a joint venture, the characteristics of joint ventures and the laws and regulations regarding joint ventures and foreign investments are studied. Only now a proposal for the division of responsibilities for the THA-grain terminal joint venture can be developed.

2.1 PRIVATISATION: GENERAL GOVERNMENT POLICY ^{10,11}

History

At independence in 1961 the government owned only three business enterprises while social services were shared by the government and non-governmental organisations. The private sector was very small and it was believed that private initiative would not be sufficient to create economic growth. Economic differences between ethnic groups and foreigners were very substantial and it was perceived that the concentration of economic power in a few individuals or ethnic groups and uneven distribution of wealth was a source of inequality and for that reason potentially vulnerable to social tension. This situation was unacceptable. So the government introduced a policy of socialism and self reliance, adopted in the Arusha Declaration in 1976. The development goal was rapid and self reliant economic growth through state control of the commanding heights of the economy. This led to the establishment of numerous parastatal enterprises in all sectors of the economy and resulted in rapid economic growth. At the end of the 1970s the parastatal sector did not generate the expected savings, tax revenues and exports and the growth became negative. Mid 1980s the parastatal sector even became loss-making, using public resources which could be used far better. In 1992 the Presidential Parastatal Sector Reform Commission (PSRC) was founded to manage the implementation of policy in parastatal reform. In 1993 the Parastatal Privatisation and Reform Masterplan was published which set out the policies and procedures which are being followed today. Implementation has continued from 1993 onwards. The parastatal reform program is set in the context of the broader reforms which were introduced from the mid 1980s onwards, since it had become clear that previous policies had failed. The gradual liberalisation of internal and external trade, of agricultural marketing, foreign exchange transactions, prices, interest rates and of the financial sector have led to greater reliance on individual initiative and corporate accountability than on the government.

Objectives

The emphasis of the reform of parastatals is on improving the efficiency of all parastatal enterprises. The following are the primary objectives which have been defined in the government's policy statement on Parastatal Sector Reform:

¹⁰ Presidential Parastatal Sector Reform Commission, *Parastatal privatisation and reform; Masterplan*, The United Republic of Tanzania (Dar es Salaam: Government Printers, 1993).

¹¹ Presidential Parastatal Sector Reform Commission, *1994 review and action plan for 1995 and beyond*, The United Republic of Tanzania (Dar es Salaam: Government Printers, 1995).

- improve the operational efficiency of enterprises that are currently in the parastatal sector, and their contribution to the national economy
- reduce the burden of parastatal enterprises on the government budget
- expand the role of the private sector in the economy, permitting the government to concentrate public resources on its role as provider of basic public services, including health, education and social infrastructure
- encourage wider participation by the people in the ownership and management of business

PSRC's role will be to transform through commercialisation, restructuring and divestiture, the performance of most significant enterprises in the parastatal sector within five years and to ensure liquidation of all non-viable parastatal enterprises as soon as possible.

The secondary objectives of the PSRC are to:

- create a more market-oriented economy
- secure enhanced access to foreign markets, to capital and to technology
- promote the development of the capital market
- preserve the goal of self-reliance

At the same time, the process of commercialisation and restructuring will be designed to ensure that the remaining parastatals will become responsive to their markets, cost-conscious and profit oriented.

Constraints

The parastatal reform program is part of the structural adjustment program. As Tanzania has hardly any experience with privatisation a number of obstacles are to be expected. At least the following four constraints have to be dealt with. First, finding capital will be difficult in any low-income country and especially in Tanzania, as it has been a socialist country. So hardly any private capital is locally available to invest in the parastatals. Foreign investors mostly prefer greenfield investments to buying a going concern. So stimulating foreign investors has to be a main point to ensure successful reforms.

Second, privatisation will cause redundancy. Although in the long term privatisation will turn the parastatals to profitable concerns that will employ many people, most parastatals are not doing very well now. This means that many employees will be redundant, as the current profits are not sufficient to pay the salaries of the employed.

Third, the existing policy uncertainty is a constraint. The PSRC is founded to reduce the uncertainties that may exist by setting out policies and procedures that will guide the process.

Finally, many specialists are involved in a single privatisation process as each reform differs from others. This means that services of lawyers, accountants, valuers, public servants, business analysts and deal-makers are needed and there seems to be a short supply in these services.

Strategy for reform

The Parastatal Sector Reform Commission categorised parastatals in three groups: social service institutions, public utilities and commercial enterprises. The social service institutions are not meant to make profits. These will be the subject of cost reduction and efficiency improvement programs. Public utilities will be expected to make profit and will be subject to cost reduction, efficiency improvement and performance monitoring programs. Non-commercial activities will be undertaken only if the utility is compensated for losses. Parts of the utilities businesses may be split off and sold before divestiture and private investors can contribute to the development of essential facilities. Privatisation of certain functions, for example, railway hotels or subcontracting certain Tanesco functions, did already start.

Commercial enterprises are expected to make profit and will become available for foreign and local investors. Those commercial enterprises which cannot be made profitable are not attractive for investors and for that reason they will be closed and liquidated. As THA belongs to the profit making commercial enterprises, commercialisation and privatisation are planned.

Privatisation process and methods

The privatisation process can be divided into three stages. The initial stage is to find out the feasibility of privatisation of a parastatal. The choice of divestiture methods is part of this stage. When the best option is chosen, the next stage is to carry out a full preparation for privatisation and prepare the last stage, the implementation.

The main divestiture methods according to the Tanzanian government, their application and implications for ownership are shown in table 2.1.

Table 2.1

Divestiture and ownership according to PSRC		
Type of divestiture	Applications	Implications for ownership
Trade sales and joint ventures	Companies requiring a technical partner and new investment.	Share concentrated in the technical partner may be 40-100%. Case for foreign investor if access provided to technical, managerial or marketing skills and new investment. Other institutional investors may be required. Portion of shares (up to say 25%) could be retained by government for later sale to public or unit /investment trusts. Some limited opportunities to retain existing management team.
Public share offering (full or partial)	Large, profitable companies with strong management e.g. BP, Agip, Tanzania Cigarette Co. initially. Later companies where ownership can safely be divorced from management.	Very diverse. Limitations can be placed on proportions held by any one individual or group or by non-citizens, etc. Blue chip shares* will help in the creation of the stock exchange, needed for liquidity of share holdings. Offer special preferences to employees. Could have core investor. Residual government powers, which need to be clearly stated and used only in limited circumstances, could be exercised through a golden share. * Shares sold to employees, to create capital.
Auction/competitive tender	Smaller enterprises, especially in competitive markets.	Concentrated. Bidders could be asked to pre-qualify. Could indicate preferences for indigenous bidders, and local over foreign bidders. Penalties on resale if preferences given.
Management buy-out	Companies with low capital requirements e.g. services, trade.	Concentrated. Preserves interests of existing management.
Liquidation	Chronic loss-makers.	Releases assets for wide redeployment.
Asset lease/management contract	Companies unattractive to buyers	Remains concentrated, with liability for later investment. Could arrange lease/purchase.

Source: Presidential Parastatal Sector Reform Commission, *Parastatal privatisation and reform masterplan*, The United Republic of Tanzania (Dar es Salaam: Government printers, 1993, p.22).

The above classification slightly differs from the one used by the World Bank.¹² In this classification, Vuylsteke mentions 7 methods of privatisation. Some equal the government divestiture methods; i.e. public offering of shares, new private investment in a state owned enterprise (SOE), sale of government or SOE assets, management buy out (Vuylsteke adds employee buy out to this method), lease and management contract. The differences are two methods not mentioned by the PSRC and one by the World Bank. Private sale of shares to identified purchaser(s) and reorganisation or break up into component parts, which in fact is a step up to privatisation, are missing in the PSRC list while the World Bank did not mention liquidation as a method.

2.2 PRIVATISATION: THA-POLICY¹³

Government policies regarding THA

The PSRC has prepared an initial assessment of the parastatals to be given priority in the reform and restructuring program. For these companies privatisation is not an immediate option, THA belongs to this group. A key element in this program is the introduction of performance contracts. A performance contract is a formally signed document, negotiated and agreed upon between government and management. The contract defines improved commercial performance objectives as well as obligations of the responsible ministry and specifies how non-commercial objectives (if any) will be financed. The contract can also define any restructuring needed to prepare the way for a future organisational, labour or financial restructuring. In October 1994, such a contract was concluded between the government and THA. The contract applies for a period of three years, starting July 1994 and is reviewed annually. The performance measures, targets and incentives are to be negotiated and agreed annually. In the contract the mission of THA is defined: *The mission of the THA as a commercial organisation is to provide the services required to promote and accommodate maritime-related commercial activities on a commercial basis by generating reasonable return on investment to sustain growth of the harbours for the benefit of the customers, employees and the national economy.*¹⁴ In the contract THA's scope of activities is restricted and the board, management and employees accept full responsibility for the performance of THA. Observations made clear that, although the political basis exists, among the workers hardly any public support is to be noticed. People are asked to do more work in the same time and take responsibility for it, while many others are to be dismissed because of the creation of a more effective organisation. Details about the performance contract and its evaluation is presented in appendix B-1.

Current situation

In May 1994 S.L.I. Consultants (a joint venture of Sandwell Inc., N.D. Lea International Ltd. and International Rail Consultants) presented the final report of the Port Development Study 1994 -2004 of the Port of Dar es Salaam.¹⁵ The study gives detailed traffic forecasts, operational analyses, preliminary engineering and hydrological investigations as well as financial and economic options available to THA. The objective of the study was to find out which improvements and expansions are required in the port of Dar es Salaam to enable it to handle the anticipated traffic in the year 2004.

¹² Vuylsteke, C., *Techniques of Privatization of state-owned enterprises, volume 1* (Washington: The World Bank, 1989).

¹³ Ministry of Transport, *Performance Contract between The Government of the United Republic of Tanzania and Tanzania Harbours Authority* (Dar es Salaam: The Government Printers, 1994).

¹⁴ See footnote 13.

¹⁵ S.L.I. consultants, *Dar es Salaam Port Development Study 1994 - 2004* (Vancouver: THA, 1994).

In its study S.L.I. Consultants use, in consultation with THA, the following definition of privatisation: *operation of a port unit by a private contractor through a long term contractual arrangement with THA*.¹⁶ Commercialisation is defined as follows: *operation of port units by THA staff and management but with the introduction of aggressive bottom line management. THA's existing managers would have overall control over their operations including the power to select staff and workforce members and maintain equipment*. In the same report it is explained that commercialisation should proceed immediately as a precursor to privatisation. According to those definitions, the THA-grain terminal is commercialised with maintenance and service contracted to a stevedoring company.

July 1995, a consortium of consultants, which were selected by the World Bank to carry out a commercialisation study for THA, started their project in Dar es Salaam. The port of Dar es Salaam was divided in several business units which all are described. The current financial performance was measured as well as market factors and prospects. End of October 1995 an interim report¹⁷ was published, April 1996 the final report was said to be finished in May 1996.

Within THA, no vision about commercialisation nor privatisation was developed, and the results of this commercialisation study will be used to form a company policy. As THA is still a parastatal enterprise, the government policy, designed by PSRC, is a guide to privatisation.

Responsibilities THA-headquarter

In the Commercialisation Study some interesting remarks about the organisation and management of THA are made.¹⁸ The current division of functions and responsibilities between THA-headquarter and the port units does not meet the requirements for an efficient organisation. THA's management is highly centralised and much of the decision making is done at headquarter's level rather than in the ports, although the headquarter management is not involved in day-to-day operations. Decisions are generated in committees or boards in the headquarter without direct personal responsibility, while those who will be responsible for the physical operations later on are not even consulted.

At this moment the Marketing Department is a part of THA headquarter and does not exist at port level. THA's current Marketing Directorate has only existed since five years. Before, it was a one-man department, with administrative activities. The current department is divided into three sections: promotion, customer services and research & information. There is no clear individual responsibility for specific sections of the market. The organisation does not have a vision on the organisation of marketing aspects in the future.

The World Bank consultants remarked about this situation that a commercialised organisation will need an overall Marketing Department for general port promotion as well as marketing on the level of the business units. The headquarter's marketing section has to be an organisation which is specialised in those marketing aspects which affects all business units. The section has to specialise itself on marketing of THA as organisation, on market research and the planning and strategic marketing. For each operational unit, the sales and marketing activities will also become a very important component. In a commercialised situation with decentralisation of responsibility from THA-headquarter to the business units, the managers of the units will have the responsibility for their economic performance. So the responsibility also covers good and reliable services to their customers. The marketing sections in the different business units have to be responsible for the operational aspects of sales and

¹⁶ SLI Consultants, *Dar es Salaam Port Development Study 1994 - 2004; Volume 3; Port operations and terminal management* (Vancouver: THA, 1994, p. 8-2).

¹⁷ Kienbaum Development Services GmbH, HPC Hamburg Port Consulting GmbH, BCS, Interfinas, *Commercialisation study; Interim report* (Hamburg: THA, 1995).

¹⁸ Kienbaum Development Services GmbH, *et al, Commercialisation study; Interim report* (Hamburg: THA, 1995, p.29-32).

marketing, like acquisition, customer satisfaction and solving of problems. So the problems can be solved near the source and the contact with the clients will be direct.

Privatisation of harbours in general

Even in the USA, *the* sound in the doctrine of free enterprise, seaports are not run only by private bodies. The economical characteristics of ports are the reason for this:¹⁹

- large initial minimum capacity needed for technical and economical reasons
- expansion of the capacity only possible by leaps for same reasons
- both initial capacity and expansion need very large investments, which either can not be paid by private investors or are not attractive to them because of the very long term and life time of the capacity
- realisation of optimal capacity at once gives substantial loss of interest caused by underuse
- gradual realisation of optimal capacity gives extra costs (no use of economies of scale)
- capacity has a long life time without an alternative use
- high fixed costs are connected to the long incorporation of capital while the variable costs are low

Other important facts are the influence of the port on the national economy; the port might be the motor of other economic activities in a region, and a seaport is a connection to the other parts of the world. Last but not least, a sea port often gives a kind of monopoly (locally and regionally) and an oligopoly on regional, national and international hinterland. In the past, the profits sometimes were one of the most important incomes of a government.

The national port politics might either be business economical or social economical. If it is business economical, the government acts like an enterprise. So the tariffs of the port services cover the costs made and eventually even create profit. This policy does not influence competition. The social economical policy does influence the port competition, as no profit has to be made.

Verhoeff distinguishes government production of port services in infrastructural services (i.e. offering of berths, quays and places to load and unload goods), suprastructural services (i.e. stevedoring, warehousing etc.) and additional services (cargadoring, expediting etc.).²⁰ This corresponds with the division of production factors in land (in case of ports also water), capital(goods) and labour. Of course a certain harbour service needs mostly more than one of those product factors, but as indicator of the dominant product factor this comparison is useful. In most other literature a harbour service is divided into:

- port facilities, which comprise the various physical assets that together constitute the port, such as breakwaters, quays etc. and
- port services, which lend life to these facilities, i.e. pilotage, cargo handling etc.

This division is more technically oriented than economically.

2.3 JOINT VENTURES AND THEIR CHARACTERISTICS

Definitions

To get a useful definition of the concept joint venture, a couple of existing definitions are given and compared. According to the PSRC a joint venture is a collaboration with a trade partner which is expected to bring in significant expertise in production, marketing, management and the capacity to expand business. Joint ventures combine components of other (divestiture) methods, typically partial

¹⁹ Thomson, J. M., *Modern transport economics* (Harmondsworth: Penguin, 1974, p. 37-39).

²⁰ Verhoeff, J.M., *Vervoers- en haveneconomie: tussen actie en abstractie* (Leiden/Antwerpen: Stenfert Kroese B.V., 1981, p. 184).

trade sale and management contracts. A joint venture partner would be expected to bring significant expertise in production, marketing, management and the capacity to expand business.²¹ According to Hall a joint venture could be any arrangement by which two or more parties come together and combine resources to accomplish a specific commercial purpose for gain.²² A joint venture may, or may not, involve the contribution of equity. Raaijmakers' definition of joint venture is an enterprise in which at least two companies financially participate and co-operate according to a mutual arrangement. This arrangement means an obligation to contribution (mostly a part of their activities). The companies keep their economical and juridical independence.²³

Van Hilten recognises four original characteristics of joint ventures: juridical and economical independence of the partners, the jointness of the enterprise, participation in the financing and the contribution of know how. Three important characteristics of joint ventures are derived: the possibility to unite unlike partners, the large risk dispersal, and the large extent of applicability of the joint enterprise. Van Hilten's definition of a joint venture is a form of co-operation of some companies which all keep their independence and which might be extended by some other economical subjects. The co-operation happens according to a common, fully differentiated enterprise, by bringing in know how and participation in the capital stock.²⁴ According to the OECD the term joint venture refers to a variety of forms of interfirm relationships, usually distinct both from cartels and from mergers between firms.²⁵ Unlike a cartel, a joint venture often involves a new project or the creation of a new process or product. Unlike a total merger, a joint venture involves only a partial and often temporary integration of the parents' functions, leaving the parents free to continue as separate operational units.

Used definition

Important characteristics in the reviewed definitions are the co-operation, juridical independence and economical independence. A useful definition of the concept joint venture is shared interest in therefore an enterprise run by at least two companies which stay independent economically as well as juridically and which have a shared interest in the business.

Types of joint ventures

OECD has made a classification of the main functional categories of joint ventures. Although hardly any joint venture fits exactly in a single functional level, categorisation according to the predominant functional aspects is useful for illustrative and analytical purposes. The classification is given in table 2.2.

²¹ Parastatal Sector Reform Commission, *Parastatal privatisation and reform masterplan*, The United Republic of Tanzania (Dar es Salaam: Government Printers, 1993, p. 22).

²² Duane Hall, R., *The international joint venture* (Boston: Praeger publishers, 1984, p. 19).

²³ Raaijmakers, M.J.G.C., dissertation (Tilburg: Catholic University of Brabant, 1976, p. 52-62).

²⁴ Hilten, H.W. van, *De joint venture als vorm van samenwerking ten opzichte van enkele andere vormen* (Apeldoorn: TVVS, 1970, p. 217-218).

²⁵ Organisation for Economic Co-operation and Development, *Competition policy and joint ventures* (Paris: OECD, 1986, p. 93).

Table 2.2

Types of joint ventures and their characteristics		
Type	Characteristics	Application
Production-manufacturing	Objective: common production <i>or</i> penetration of a new geographical market <i>or</i> manufacturing new products or providing new services.	This type of joint venture can cover a very broad variety of sectors and products and involves parties from various countries. For example: steel industry, chemical industry, Japanese firms often involved in manufacturing of high-technology products.
Buying and selling	Joint buying: partners buy unilaterally. This may give buying power. Joint selling: selling on behalf of members. To gain access to new markets and existing distribution channels.	Sometimes used in international trade to countervail the market power of foreign suppliers. Often exclusive selling agreement covering all or part of the products and markets of the parties, accompanied by the fixing of prices and terms of sale.
Service	Particular for trading and associated services. Linked with the development of new technologies.	Relatively new (ca. 20 years old). To encourage service enterprises to increase efficiencies through inter-firm cooperation.
Research and development	Basic or applied research, commercial development or a combination of these elements.	Set up by very different types of enterprises, not only in high-technology sectors but also in a large variety of industries. They involve both state-owned and private enterprises.
Natural resource exploration and exploitation	Mining.	Major company having financial means and expertise and a small company holding a mineral claim.
Engineering and construction	International trade, notably in trade between small and medium-sized enterprises and the developing countries and in the East-West economic context.	Often form of turnkey contract: constructor is responsible for the construction of an operational plant in one host country.
International aspects of joint ventures	Specific problems may arise such as the definition of relevant markets and questions of jurisdiction.	

Source: Organisation for Economic Co-operation and Development, *Competition policy and joint ventures* (Paris: 1986, p12-18).

2.4 PRIVATISATION: THA-GRAIN TERMINAL

The grain terminal is not a separate terminal but part of the general cargo terminal. However, the bulk grain handling is located on a self contained site and is concentrated around gate 4. It comprises storage silos, bagging plants and associated workshops. Its activities are the bagging of bulk commodities, mostly grain and sometimes sugar or fertiliser, both in the terminal and at the quayside and their storage in the silos. The bagging capacity is over 1,500 tonnes per day. In the past the authority rented private services for bagging of grain or fertilizers, but this became too expensive. As THA did not have any experience in the bagging services and, more important, THA is, according to

it's foundation act, not allowed to conclude demurrage and despatch contracts²⁶ which are usual in stevedoring of free flowing commodities, the management decided to involve a private company and the British consultancy Nectar Shipping and Projects Ltd. was contracted. The responsibilities for the grain terminal are strictly separated. THA contributes space, machines, equipment and general labour. Nectar is responsible for discharging and bagging at performance rates which are agreed with World Food Programme (WFP). If Nectar performs less, the company is demurraged. The responsibility for the maintenance and servicing of the machines, spare parts included is Nectar's, and the consultant should also train THA-staff in maintenance and operation of equipment. Another task is the marketing of THA-services, to win business. Where demand exceeds the available capacity, Nectar is responsible to arrange the needed equipment. Penalties for delays are also on Nectar's account. The revenues of the grain terminal are shared on a fifty-fifty basis between THA and Nectar, before costs are subtracted.

Aims of joint venture THA-grain terminal

The PSRC decided that the THA-grain terminal would become a joint venture in 1995. In the third annex of the Review and Action Plan for 1995 and Beyond all divestures being prepared for 1996 onwards are mentioned per ministry. At the Ministry of Communications and Transport nothing about THA is reported. All mentioned corporations for action are to be privatised by share sale in 1996.

In order to achieve a higher level of efficiency and competitiveness, THA and PSRC decided to involve private participation in the management of the grain terminal. The objectives of this private participation are formulated in the tender document and overlap each other.²⁷ The first aim was the improvement of profitability by managing the terminal as a commercially viable business entity. This should create a higher contribution towards the overall profitability of the authority. Secondly, the participation is expected to improve the efficiency of the grain terminal, and this way it will become more competitive than similar facilities available in the region. The third aim is to maximise utilisation of the facility. A private operator will help to market the facility in a more aggressive way. To find a suitable partner, THA invited bids via a tender. Nectar won the bids.

Laws and regulations with regard to joint ventures

The Investment Promotion Centre (IPC) was established in June 1990, in order to promote, co-ordinate, regulate and monitor foreign and local investments. The belonging act repeals the Foreign Investment Protection Act.²⁸ Reason to found the IPC was the liberalisation program, which was meant to promote rapid economic development and growth. Tanzania owned many natural resources which are to be explored with help of private investment. The task of the IPC is to design an institutional framework for investors to operate within and provide them with incentives and guarantees in order to encourage investments particularly in areas of national priority. The IPC is meant to give effect to the deliberalisation policy and to enact a more comprehensive legislation to govern investments in all areas.

According to the Investment Promotion Centre, a joint venture is an association, whether incorporated or unincorporated, between foreign investors and local co-operative or parastatal organisations, foreign

²⁶ *Demurrage*: reimbursement the charterer has to pay to shipowner in case of exceeding agreed loading time or unloading time. In case of bulk grain handling in Dar es Salaam, the stevedoor is made responsible for the loading or unloading time, and for the fine.
Despatch money: reimbursement paid by shipowner to charterer, in case of faster loading or unloading than planned. As a rule, despatch money amounts 50% of demurrage. Again in Dar es Salaam, the stevedoor is made responsible.

²⁷ Tanzania Harbours Authority, *Tender documents for participation in the management of the grain terminal at the port of Dar es Salaam* (Dar es Salaam: THA, 1994).

²⁸ Investment Promotion Centre, *The National Investment (Promotion and Protection) Act*, Principal Legislation, no. 10 of 1990, revised edition 1992 (Dar es Salaam: Government Printers, 1992).

investors and local private investors, domestic private investors and local parastatal and, or co-operative organisations, for the purpose of making an investment jointly in an enterprise in respect of which an application may be made for a Certificate of Approval. Otherwise, no laws and regulations exist.

Other aspects relevant to joint ventures: finance and labour

Foreign Investments

In 1963 an act was adopted to give protection to certain Foreign Investments.²⁹ In this act it was arranged that a foreign national³⁰ was only allowed to have investments in Tanganyika after application to the Minister of Finance. The minister had to consider every application made and only when the enterprise would stimulate the economic development or benefit the country otherwise, a certificate of approval was issued to the applicant.

In 1990 the Investment Promotion Centre was founded, which is an ammendment of the Foreign Investments (Protection) Act.³¹ In this act, joint venture is described as *an association, whether incorporated or unincorporated, between foreign investors and local cooperative or parastatal organisations, foreign investors and local private investors, domestic private investors and local parastatal and, or cooperative oranisations, for the purpose of making an investment jointly in an enterprise in respect of which an application may be made for a Certificate of Approval.*

In this act three types of investment areas are known, which are dealt with here. Further details are set out in appendix B-2. First group enclose the priority areas for investment. THA-grain terminal belongs to this group, covered by the sector transit trade, as its activities relate to the transit of goods to neighbouring countries. Other sectors are agriculture and livestock development, natural resources, tourism, manufacturing industries, petroleum and mining, construction and transport. The second group contains the controlled and reserved areas. Controlled areas shall normally be reserved for public investment or joint public and private enterprises, as the areas are of major economic importance. Exceptions may be made for some sectors. The reserved areas are of strategic importance and for this reason exclusively reserved for investment by the public sector, except where special licenses may be granted. The third group of areas is reserved for local investors. All sectors which only need small investments belong to this group, like operation of taxis, ice-cream making, bakeries etc. In some of those areas, to be stipulated by IPC, foreign investors with less than two hundred and fifty thousand US dollars will be excluded.

According to part 3, section 9 of the Foreign Investments (Protection) Act any local and foreign investor is allowed to invest in a new enterprise, but some conditions have to be fulfilled. First is that the investments have to be another area than in the ones reserved exclusively for the public sector or local investors. Then the investor has to apply for a Certificate of Approval, the application has to be accompanied by a statement on the likely contribution of the enterprise to objectives set by the IPC.

²⁹ The Republic of Tanganyika, *Foreign Investment (Protection) Act*, Act 1963, no. 40 (Dar es Salaam: Government Printers, 1963).

³⁰ *Foreign national*: a person who is not a citizen of Tanganyika, and includes a body corporate not being a body incorporated in Tanganyika.

³¹ Investment Promotion Centre, *The National Investment (Promotion and Protection) Act*, Principal Legislation, no. 10 of 1990, revised edition 1992 (Dar es Slaam: Government Printers, 1992, p. 5).

The major objectives are:

- maximisation of foreign exchange earnings and savings
- enhancement of import substitution activities which achieve identifiable substantial foreign exchange savings
- expansion of food production
- achievement of a high degree of technology transfer
- creation of employment opportunities and the development of human resources
- the efficient utilisation, expansion and diversification of the productive capacity of existing enterprises
- provision of services or production of goods which improve linkages between the various sectors of the economy

Additional objectives are:

- capital, technical skills and raw materials available to the applicant
- local materials' supplies and services to be used by the applicant
- interests and conditions of service of the labour employed or to be employed by the applicant
- general promotion and development of enterprises within Tanzania and the need to generate constructive competition among enterprises
- potential demand, both within the United Republic and elsewhere, for the product or services of the enterprises
- siting or proposed siting of the enterprise in relation to the availability of power, fuel, labour, transport, raw materials, land and water
- promotion of balanced and equitable growth throughout the country
- interests of potential consumers from investment in the enterprise being undertaken

The application will be submitted to the ministry, government department or agency with sectoral responsibility for enterprises of such nature. The institute to which the application is sent has to respond to the IPC with any comments on the request. Then the IPC will grant or refuse the application subject to the degree of meeting the objectives mentioned above.

Foreign valuta

With the introduction of the liberalisation policy the exchange rate was decontrolled. For joint ventures no special rules regarding foreign exchange exist. Like other companies, joint ventures are responsible for foreign exchange needed to pay their foreign expenses.

Fiscal aspects

According to section 21 of the Foreign Investments (Protection) Act, for an approved new company the whole of the tax payable with respect to the gains and profits shall be remitted for five years. After this period the tax shall be chargeable at rates which depend on the type of enterprise. Per June 16th 1995, this article changed: import duties on machinery and equipment necessarily required for the establishment of an approved enterprise and imported for use solely and exclusively in such approved enterprise is per this date set on 5%, also the payment on sales is set on 5%. Since this new tariff is set, no negotiations about the tariffs are possible anymore. Newly founded companies can receive a tax holiday of 5 years.

If the approved enterprise is the rehabilitation or expansion of an existing enterprise or where an approved enterprise is rehabilitated, the tax calculated for the enterprise shall be calculated and charged on the income in respect of the total dividends, royalties or interest paid. Import duties for all machinery, equipment spare parts, materials and supplies necessarily required for operation of the enterprise, are set on 5%. No special taxes for foreign entrepreneurs do exist.

Staff³²

According to the law, recruitment should happen under local qualified citizens. Only in case of no suitable locals available, foreigners may be employed. The Security of Employment Act provides for the establishment of JUWATA Field Branch Committee (Tanzania Worker's Organisation) which have to be consulted in all cases in which an employer intends to take disciplinary action against an employee, and no employer may impose a disciplinary penalty without first consulting the JUWATA Field Branch Committee. Where there is no such Field Branch the employer has to inform the Labour Officer of the area as well as the local JUWATA Official.³³ In case an employee commits an offence, the workers union and the management of the corporation meet. If the employee is found guilty the appointing authority deals with the case.

2.5 CONCLUSIONS

Table 2.3 presents the aims and conditions for a new grain terminal joint venture. The table will serve as a starting point for the discussions about the best possible form of joint venture.

Table 2.3

Aims and conditions for new grain terminal joint venture	
Aims government	<ul style="list-style-type: none">• improve operational efficiency• improve profitability• expand role of private sector• encourage wider participation by people in ownership and management• create more market oriented economy• to enhance access to <i>foreign</i> capital and technology• develop capital market• preserve self reliance• commercial enterprises become available for foreign and local investors
Aims THA	<ul style="list-style-type: none">• long term contractual arrangement with private contractor• reasonable return on investment (what is reasonable?)
Aims THA-grain terminal	<ul style="list-style-type: none">• temporary private participation in mgt GT, to achieve:<ul style="list-style-type: none">increasing profitabilityimprove efficiencymaximise utilisation of facility

³² The Association of Tanzania Employers, *Salient things you should know about the labour laws* (Dar es Salaam: 1988).

³³ Ministry of Justice, *The Security of Employment Act; Act No. 62 of 1964 - Cap, Amendment by Act 45 of 1969 and No. 1 of 1975* (Dar es Salaam: Government Printers, 1976).

Aims and conditions for new grain terminal joint venture

Aims IPC	<ul style="list-style-type: none"> • maximisation of foreign exchange earnings and savings • enhancement of import substitution activities which achieve identifiable substantial foreign exchange savings • expansion of food production • achievement of a high degree of technology transfer • creation of employment opportunities and the development of human resources • efficient utilisation, expansion and diversification of the productive capacity of existing enterprises • provision of services or production of goods which improve linkages between the various sectors of the economy • capital, technical skills and raw materials available to the applicant • local materials' supplies and services to be used by the applicant • interests and conditions of service of the labour employed or to be employed by the applicant • general promotion and development of enterprises within Tanzania and the need to generate constructive competition among enterprises • potential demand, both within the United Republic and elsewhere, for the product or services of the enterprises • siting or proposed siting of the enterprise in relation to the availability of power, fuel, labour, transport, raw materials, land and water • promotion of balanced and equitable growth throughout the country • interests of potential consumers from investment in the enterprise being undertaken
Laws and Regulations	<ul style="list-style-type: none"> • investments only allowed in certain areas; see also appendix B-2 • Certificate of Approval needed (granted by IPC, only when aims are met)
Financial aspects	
• foreign investments	<ul style="list-style-type: none"> • any foreign investor is allowed to invest in new enterprises, except certain areas
• foreign valuta	<ul style="list-style-type: none"> • no special legislation
• fiscal aspects	<ul style="list-style-type: none"> • newly found enterprises receive a 5 year tax holiday • after tax holiday, import duties on machinery and equipment required (for use only) 5% • tax on sales: 5% • no special taxes for foreign entrepreneurs
Staff	<ul style="list-style-type: none"> • recruitment among <i>local</i> qualified citizens, unless impossible

In 1984 Nectar Shipping and Projects Ltd. was involved in the grain terminal with a bagging contract for quay side bagging of grain and fertiliser. When at the end of the 1980's the grain silo and three bagging units were provided by a Dutch aid program, the company's contract changed into a management contract for all bagging operations in the port. THA's responsibility are the main production factors: space, general labour and machines and equipment, while Nectar is responsible for discharging and bagging, maintenance and service of the equipment and training the THA-staff in maintenance and operation of the equipment. Also marketing of the terminal to bring in customers belongs to Nectar's tasks. Officially the company has no responsibility for the management of the silo itself, but in practice Nectar provides management assistance to silo operations. Recently, THA decided to operate the terminal on a joint venture basis and Nectar won the bids. In April 1996 the negotiations between the two parties and the PSRC had not started yet. Despite the contract, Nectar pays for labour itself, as the staff paid by THA in practice is not available. In the current situation, the Tanzanian management is finally responsible for the grain terminal and Nectar is operating under this management. Informally, however, the role of the Nectar representative in the management of the silo is prominent. Nectar has provided management assistance to silo operations and helped with spare parts supply, etc. Because of the formal structures, however, Nectar has no official voice in important situations, i.e. in meetings with important clients.

The will of privatisation is inseparable from the wish to improve the terminal's profitability, efficiency and utilisation. This implies that the current system does not fully satisfy and the division of responsibilities should be reviewed.

Table 2.4

Current division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • final responsibility to THA-HQ, DSM-port management, general cargo terminal management and clients • space • silo ownership and management • machines and equipment • general labour 	<ul style="list-style-type: none"> • discharging • bagging • maintenance equipment • service equipment • procurement equipment • training in maintenance and service equipment • marketing

As the discharging and the bagging belong to Nectar's tasks, it would be wise to make them responsible for the labour needed to perform those tasks. The current situation, in which THA employs people who are not available for the work, is in fact a waste of money as Nectar has to recruit the workers needed, and of course also has to pay them. In fact two groups of people are being paid for work which is done by only one group. In practise some overlap exists between the two groups. As discussed in paragraph 2.4, Nectar is to be demurraged when the bagging and discharging rates are not made. For those reasons it is better to make the joint venture partner responsible for all facets which could influence the discharging and bagging performance.

Another problem is caused by the situation that Nectar is responsible for the marketing of the grain terminal, but has no official voice in meetings between the terminal management and it's clients. Currently this gives some problems in meetings with World Food Program (WFP), the terminal largest client at the moment, where the Nectar representative is asked not to get involved in the conversation. This is unreasonable, particularly as Nectar has to perform at rates agreed with WFP. As Nectar's performance and marketing results are of great influence for the clients of the grain terminal, it would be wiser to give the company a final responsibility to the general cargo terminal management, the port management of Dar es Salaam-port and THA-management. Nectar has to be authorized to take decisions regarding the grain terminal. Stevedoring without having the storage space is not realistic, so Nectar's responsibilities should be extended with the silo management. The silo ownership should stay at THA, as it belongs to the space.

Maintenance and service of the equipment already is for Nectar's account, as well as the training of staff for this jobs. Conform the aim to stimulate a market oriented economy, stevedoring has to be privatised in the medium long term. This means that each reliable company which is interested, has to be able to offer stevedoring facilities. So Nectar will in future not have a monopoly anymore, but is also able to offer it's stevedoring activities. With those expectations, Nectar should have it's own bagging equipment, being able to maintain and service it by it's own people. For this reason it seems not very useful to train THA-staff for those tasks, unless Nectar is going to employ those people. But the company has to employ locals, so it might be interesting to train people and employ them later on.

The final responsibility for the grain terminal is transferred to Nectar. But one of the government's aims of privatisation is to preserve self reliance, so an urge exists to keep this responsibility in Tanzanian hands. The final responsibility is therefor only given to the joint venture partner on strict condition to train the future grain terminal management within a limited time. Afterwards, the trained management has to be able to hold sway over the terminal, under penalty of a fine. In the training period, the future management has to learn how to use modern information systems and how to set up good records (currently most information available is just copied from Nectar files). The use of planning systems and maintenance and service schedules has to be part of the training as well. A mentality change of the management as well as the labourers has to be achieved. See also paragraph 3.7, where is dealt with culture differences.

In table 2.5 it is shown how the division of responsibilities between the THA-grain terminal and Nectar has to be temporarily, to create the final situation, shown in table 2.6.

Table 2.5

Proposed interim division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • space • silo ownership • machines and equipment 	<ul style="list-style-type: none"> • final responsibility to THA-HQ, DSM-port management, general cargo terminal management and clients • silo-management • discharging • bagging • maintenance of equipment • service of equipment • procurement equipment • general labour • training future grain terminal management • marketing <p>(• training in maintenance and servicing equipment)</p>

Table 2.6

Proposed final division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • final responsibility to THA-HQ, DSMport management and general cargo terminal management • space • silo ownership 	<ul style="list-style-type: none"> • final responsibility to clients • silo management • machines and equipment • discharging • bagging • maintenance of equipment • service of equipment • procurement equipment • general labour • marketing

Checking proposed joint venture against government aims

Checking the proposed joint venture against the government's privatisation aims, one will find that the improvement of operational efficiency and profitability will stand a chance to met. Nectar is a commercial enterprise, so it's aims will be increasing efficiency to decrease the costs to improve the profitability. According to the proposal, in the short term Nectar will be the only company managing stevedoring activities, so the aim to expand the role of the private sector will not be met. In the medium long term, however, it is advised to privatise stevedoring, which meets two other aims put by the government: expansion of the role of the private sector and creation of a more market oriented economy. The goal to preserve self reliance is only met in the medium long term, like the aim to encourage wider participation by people in management, as the advise in the proposal is to hand over the final responsibility to Nectar in the short term. After the management being trained for the jobs, the responsibility will be transferred to employees of THA again. Wider participation of people in ownership is an aim which will not be met at all. The joint venture will make the discharging in the grain terminal of Dar es Salaam port more efficient. Creating more similar joint ventures will make the

overall port operations more efficient and profitable. Between those who are in port business, this will be known very soon and for this reason it will become easier to attract foreign capital and technology. This might also develop the Tanzanian capital market. The joint venture proposed already is a commercial enterprise which became available for foreign and local investors.

In table 2.7 an overview of the way in which the proposal will meet the government aims is given.

Table 2.7

Fulfillment of government aims				
Government aims	Short term	Medium long term	Long term	Not met
improve operational efficiency	●	●	●	
improve profitability	●	●	●	
expand role of private sector			●	
encourage wider participation by people in <ul style="list-style-type: none"> • ownership • management 	●	●	●	●
create more market oriented economy		●	●	
to enhance access to <i>foreign</i> capital and technology		●	●	
develop capital market				●
preserve self reliance		●	●	
commercial enterprises become available for foreign and local investors	●	●	●	

Additional measures

To meet the goal of wider participation in ownership by people, sale of shares could be a solution. But because of the strategic importance of the port for the whole country (see also paragraph 2.2) this does not seem to make sense. Another argument against this measure is the lack of private capital in the country.

To expand the role of the private sector, a local stevedore could be subsidized by the government to operate at the terminal. Neither does this initiative seem to be valuable: these kind of measures work against the goal to create a market oriented economy and subsidizing often creates weak companies. Only temporarily subsidizing might assist.

In Tanzania, privatisation of banks has not started yet. Beginning 1996, only 2 small private banks existed, all other banks are still government owned. It is impossible to develop a capital market without the banking system being privatised. Without privatised banks, no stock exchange is possible and for this reason wider participation in ownership will be fiction.

CHAPTER III IMPROVING CARGO THROUGHPUT OF THA-GRAIN TERMINAL

To assess the efficiency and productivity of the procedures and performance of Dar es Salaam port, this port is compared with port of Rotterdam, the benchmark organisation. The port of Rotterdam is known as one of the world's best ones and for this reason chosen as the benchmark organisation. To create some insight in the functioning of both ports, their characteristics are listed. As this report focuses on Dar es Salaam's grain terminal, the import and export procedures of both ports regarding the specified free flowing commodities (grain, sugar, fertiliser) are described. Then the port performance indicators of the United Nations Conference on Trade and Development (UNCTAD) are described and when the two harbours are compared on basis of these indicators, the differences between both ports become clear.³⁴ The operational constraints are found and elevated with help of a logistical theory. The cultural constraints are found and elevated by use of literature.

3.1 CHARACTERISTICS DAR ES SALAAM PORT AND BENCHMARK ORGANISATION

Both the ports in Rotterdam and Dar es Salaam are important in their region. In 1990 the port throughput in Dar es Salaam was the second largest of East Africa while port of Rotterdam is the largest in Europe. Nevertheless enormous differences between the ports exist. This becomes clear when comparing the main characteristics of the ports, which is done in table 3.1.

Table 3.1

Characteristics ports of Rotterdam and Dar es Salaam			
Characteristics	Port of Rotterdam		Dar es Salaam port
<i>Traffic</i>			
no. of ships	<ul style="list-style-type: none"> • sea ships 30,000 • inland ships 250,000 		<ul style="list-style-type: none"> • deep sea ships 500 • <i>dry cargo tankers</i> 100 • coastal ships 3,900 • <i>dry cargo tankers</i> 100
total throughput (tons)	294,300,000		4,840,800
• <i>import</i>	86,373		2,134,300
• <i>export</i>	48,426		553,800
• <i>transit</i>	154,362		2,152,700
• <i>entrepot storage</i>	117,283		
total throughput			
• <i>container (TEU)</i>	4,574,000		92,200
• <i>general cargo (tons)</i>	71,200,000		1,259,200
• <i>dry bulk (grain, sugar, fert.)</i>	87,700,000		287,700
• <i>bulk liquids (tons)</i>	133,400,000		2,304,900

³⁴ United Nations Conference on Trade and Development, *Port Performance Indicators* (Geneva: UNCTAD, 1976).

Characteristics ports of Rotterdam and Dar es Salaam

Characteristics	Port of Rotterdam	Dar es Salaam port
turn roundtime (days)	no information	4.6
• deep sea general cargo		3.3
• deep sea tankers		2.3
• dry cargo coasters		2.3
• tanker coasters		
Economic		
value added	by total port complex (* mln fl. of 1987) f 9,909.1	by grain terminal US\$ 1,500,000
economic activities	<ul style="list-style-type: none"> • cargo transshipment and transit • distribution (re-grouping, processing, re-packing, labelling, pricing and testing to storage) • chemical industry 	<ul style="list-style-type: none"> • cargo transshipment and transit • bagging of dry bulk cargo
contribution to GDP	1994 2.1 %	1992/93 0.47 %
various commodities		
• imports	mach. & transp. equipm. 31.6 % food, beverages, tobacco 12.3 % chemicals & chem.prod. 10.7 % mineral fuels 8.6 % textiles 7.0 % metals & met.prod. 6.7 % raw materials, oils, fats 4.7 % other 11.4 %	mach.& transp. equipm. 46.0 % basic manufactures 16.3 % fuel 10.2 % chemicals 8.8 % metals 5.5 % food 5.4 % other 7.8 %
• exports	mach. & transp. equipm 23.8 % food, beverages, tobacco 20.5 % chemicals & chem. prod. 15.9 % mineral fuels 8.6 % metals & met. prod. 6.2 % textiles 4.8 % other 20.2 %	coffee 25.9 % cotton 23.6 % sisal 1.4 % other 49.1 %
country of origin commodities		
• imports	Germany 28.8 % Belgium/Luxembourg 14.2 % United Kingdom 8.6 % France 7.9 % United States 7.6 % Other 32.9 %	United Kingdom 16.2 % West Germany 10.5 % Japan 10.5 % Italy 8.5 % Sweden 3.8 % The Netherlands 3.5 % Other 47.0 %
• exports	Germany 28.8 % Belgium-Luxembourg 14.3 % France 10.6 % United Kingdom 9.2 % Italy 6.4 % Other 20.7 %	West Germany 22.6 % United Kingdom 16.6 % The Netherlands 6.9 % Singapore 5.9 % Italy 5.2 % Japan 4.8 % Other 38.0 %

Characteristics ports of Rotterdam and Dar es Salaam

Characteristics	Port of Rotterdam	Dar es Salaam port
Organisational		
ownership	Port of Rotterdam is managed and operated by the municipal government. The state owns and maintains the maritime entrance and the connecting waterways. The local council appoints the managing director. The town council owns the port's plots and basins. Investments for dry and wet port infrastructure are paid by Rotterdam Municipal Port Management (RMPM)/the town council. The port infrastructure is rented or leased on base of long term contracts. RMPM exploits the traffic escort and nautic management. Transshipment companies are all private and are responsible for the costs of superstructure. Rents and harbour dues belong to the most important revenues.	THA is a state owned enterprise and no private companies are acting in the port, performing port services, but Nectar. The Tanzanian government appoints the managing director in consultation with the board of directors. All infrastructure and superstructure is owned by THA and maintenance is of course for THA's account. Where demand exceeds the available capacity of the grain terminals machinery, Nectar is responsible to arrange the needed equipment. Nectar also is responsible for the maintenance of all bulk and bagging machinery and equipment.
employment	RMPM 1,100 direct in Port of R'dam 67,200 indirect 300,000	THA, in port 8,000 indirect no information
Functional		
transit traffic (%)	excl. entrepot storage 53 % incl. entrepot storage 38 %	44 %
destination transit traffic	European Community 48.3 % Other European countries 4.6 % Other 47.1 %	Zambia 71.6 % Zaire, Burundi, Rwanda 19.1 % Malawi 7.9 % Uganda 1.3 % Zimbabwe 0.1 %
Trends		
sea shipping	<ul style="list-style-type: none"> • expansion of world fleet • increase in scale of ships • increase in container capacity 	
cargo transshipment	1989 - 1993 <ul style="list-style-type: none"> • slight decrease dry bulk • increase liquid bulk • slight increase general cargo • increasing containerisation • slight decrease in ship calls 	1989 - 1992 <ul style="list-style-type: none"> • break bulk (grain and fertilizer) stable, but peak from 1992, caused by emergency grain deliveries for World Food Program (WFP) • strong increase of liquid bulk (25%) • almost doubling of container cargo
value added	<ul style="list-style-type: none"> • increasing value added by Dis- triport, Foodport and Chemicals Mainport 	

Characteristics ports of Rotterdam and Dar es Salaam

Characteristics	Port of Rotterdam	Dar es Salaam port
employment	<ul style="list-style-type: none"> direct employment decreased by developments in labour productivity, new technology, new representation of cargo and more efficient management employment multiplier is 5.4 	<ul style="list-style-type: none"> decreasing no. of jobs, caused by commercialisation and privatisation
investments	<ul style="list-style-type: none"> MPMR only invests in infrastructure (sites, quays, roads, bridges etc.) promoting creation of value added by promotion of industrial character 	<ul style="list-style-type: none"> investments both in infrastructure and superstructure; Port Development Project
environment	<ul style="list-style-type: none"> increase of inland shipping, especially in case of containers increase of rail serving port, as international rail shuttles are opened (in future more because of decision regarding <i>Betuwe Line</i>) 	<ul style="list-style-type: none"> slight increase of rail serving, as Tanzania Rail Corporation (TRC) recently received some wagons from World Food Programme (WFP)
<ul style="list-style-type: none"> <i>hinterland</i> <i>pollution</i> 	<ul style="list-style-type: none"> oil tankers with quality certificate (Green Award) are allowed 6% discount on port dues development of cheap, soil cleaning concepts usable on large scale operating industrial noise information system lowering loading speed oil tankers in case of meteorological conditions causing large quantities of vapour emitted 	<ul style="list-style-type: none"> Within present organisational structure of THA no specific department holds responsibility for environmental matters, nor is an environmental policy formulated and adopted; spills, spraying of grit materials from equipment maintenance and handling of dangerous cargo are main sources of pollution within THA. No arrangements for the disposal of oily ballast and bilge waters do exist. A lack of harbour patrols to enforce the regulations exists and no emergency plans to react to spillages in the harbour exist.
Future expectations		
economic	<ul style="list-style-type: none"> although contribution to GDP decreased, the indirect importance of the port will increase, by compensation by development of industry expansion chemical industry starting recycling industry 	<ul style="list-style-type: none"> strong(er) competition between regional ports is to be expected
organisational	<ul style="list-style-type: none"> electronic notification added and those digital systems linking up with each other 	<ul style="list-style-type: none"> commercialisation and privatisation port and port services
cargo transshipment	<ul style="list-style-type: none"> increase intra-European trade increase trade with Asian countries continuing increase containerisation 	<ul style="list-style-type: none"> continuing increase containerisation slight decrease in trade caused by GDP growth
location	<ul style="list-style-type: none"> shortage of space from 2000 onwards expected; 	<ul style="list-style-type: none"> deepening entrance channel is necessary

Characteristics ports of Rotterdam and Dar es Salaam

Characteristics	Port of Rotterdam	Dar es Salaam port
environment	<ul style="list-style-type: none"> • reduction in noise at location • realisation of vapour processing installation with which mixtures of inert gas, hydrocarbons and substances which cause a stretch can be treated when loading oil tankers 	<ul style="list-style-type: none"> • consultants advise foundation of a department to assume responsibility for environmental issues

Sources: Encyclopaedia Britannica, *Britannica Book of the Year 1995*; *Events of 1994* (Chicago, 1995); Rotterdam Municipal Port Management, *Annual report 1995*, Port of Rotterdam (Rotterdam: 1996); Directie Haveninnovatie, *Trendrapport 1994*, HavenInformatieBank DHI033/94, Port of Rotterdam (Rotterdam: 1994); Mez, H. du (red.), *Hamburg-Le Havre Range: Analyse ontwikkelingen 1990-1994*, HavenInformatieBank DHI037/95, Port of Rotterdam (Rotterdam: 1995). HavenInformatieBank, Gemeentelijk Havenbedrijf Rotterdam (i.e. Centraal Bureau voor Statistiek, the Netherlands); Tanzania Harbours Authority, *Annual Report 1992/1993*, (Dar es Salaam: 1994); SLI consultants, *Dar es Salaam Port Development Study 1994-2004, Volume 2, Shipping and Traffic Forecasts*, SLI consultants (Vancouver: 1994).

The difference in dimension is shown by the number of sea ship calls in Rotterdam (50 times the number calling Dar es Salaam) and the total cargo transferred in Rotterdam (60 times the quantity of cargo transfer in Dar es Salaam). In Rotterdam the number of small (inland) ships amounts 8 times the number of sea ships calling the port. In Dar es Salaam the proportion large sea ships versus small ships amounts 4. The economic position of the hinterland of port of Rotterdam and the excellent connections explain much of the difference. The GDPs of the European countries connected with the port of Rotterdam are a multitude of the ones of Dar es Salaam's hinterland. The largest port in an economically booming region is, of course, more advanced than a large port in a poor region. Furthermore, Dar es Salaam is a transit port while port of Rotterdam next to transit, also provides facilities for trade and industry. The port in Rotterdam contributes 2% to the countries GDP, against almost 0.5% by the port in Dar es Salaam. Rotterdam port is a so called landlord port, headed by the Rotterdam Municipal Port Management (RMPPM). The government (RMPPM) provides infrastructure, which is available to private enterprises. THA is a parastatal organisation, which means that all services are fully organised by governmental enterprises. In Rotterdam the creation of value added is promoted by promotion of industry; the port is not only a harbour but also an industrial site. This in contrast to the ports governed by THA, which all are meant for transfer of goods only. Last issue of importance is the way both ports deal with the environmental effects of their existence. Rotterdam makes an attempt to limit the negative environmental effects, while in Dar es Salaam not even basic measures exist.

In the port of Rotterdam, not only grain, fertiliser and sugar belong to the dry bulk, but also pumice, clay sand, etc. For convenience in this report the term *dry bulk* is used when meaning grain, fertiliser and sugar. In table 3.2 the trends of dry bulk transshipment are shown; details about the quantity are to be found in appendix C-1.

Table 3.2

Trends dry bulk in ports of Rotterdam and Dar es Salaam	
Trends in Rotterdam	Cause
<ul style="list-style-type: none"> improving position in Europe decreasing transshipment 	<ul style="list-style-type: none"> larger ships, which have a deeper draft, so the possible ports to call become more limited. Also, port of Rotterdam is cheapest option as it is a sea port satisfaction human consumption European agriculture policy: smaller live stock, import duties on foreign grains
Trends at THA	Cause
<ul style="list-style-type: none"> increase import of grains slight increase of fertilizer 	<ul style="list-style-type: none"> most grains are imported by the World Food Program (WFP) and sent to the refugee camps near the border or to neighbouring countries used primarily in Tanzania, Zambia, Malawi and Burundi; caused by increase of food production

3.2 DRY BULK HANDLING: BENCH MARK ORGANISATION

Most bulk shipping in Europe is done by tramp shipping: shipping of cargo overseas between ports and on conditions which are agreed in a charter party. This means unregular transport without a fixed route. Grain and other free flowing commodities are almost only shipped by tramp shipping. As only the procedures regarding handling of certain free flowing commodities are of interest for this research, only tramping procedures are described. Many documents are involved, which are described in appendix C-2. As this appendix is made on a fold out sheet, the descriptions can easily be hold next to the text.

Handling inward cargo

A shipbroker's office daily receives a shipping list with all ships to be expected soon. The shipbroker sends a notification to the harbour service³⁵, with facts about the ship, it's draft, berth and the kind of cargo. Before arrival, the shipbroker receives the manifest, bill of lading, stowage plan and hatchlist, as well as a specification of the dangerous cargo and the expected time of arrival. The shipbroker sends a message to the harbour co-ordination centre (HCC)³⁶. HCC and customs give ship and cargo permission to enter the port when nothing is inconsistent with admittance. For the stevedoor it is often hardly possible to reserve a mooring place in advance; the berth is most often only known just before arrival. The shipbroker's operational department has to contact several organisations before the ship can enter. Of course the stevedoor has to be contacted about the expected time of arrival and the expected time of sailing, which is the ship's ultimate time of departure.

³⁵ Harbour service is a department of RMPM. The harbour master is the head of the harbour service. Tasks which belong to department are allocation of berthing places to ships and preserve order and safety.

³⁶ HCC is a department of RMPM which co-ordinates the shipping traffic in Port of Rotterdam.

Once the ship is approaching the Nieuwe Waterweg, the captain announces the expected time of arrival via Scheveningen Radio to Koninklijke Scheepsagentuur Dirkzwager³⁷. Dirkzwager notifies HCC of the arrival of the ship and HCC informs the customs, Pilot Maas, tug service, boatman association and the river police. Customs notifies immigration officers.

Custom officers enter the ship after berthing, but in case of some other commodities, custom officers enter the ship at the Nieuwe Waterweg, performing the checks against documents while the ship is still sailing. Clearance of the cargo means checking documents which contain information about the load. In case of dangerous cargo aboard, this has to be mentioned to HCC and the tonnage has to be declared. After agreement those documents are signed by the customs and the ship.

Pilot Maas sends a river pilot to the ship. The harbour service also sends a port pilot. The river pilot boards just before entering the Nieuwe Waterweg, the port pilot, with help of tug service, takes over to berth. River pilots as well as port pilots were in the past employed by either government and local authority but since 1988 both groups are privatised. Tug service helps the ship manoeuvre in the port and the boatmen make sure that the ship is berthed at the right place, cable and uncable the ship. Immigration officers and people who do the environment and safety check, enter the ship after berthing. Only when a problem is identified before berthing, so the procedures will take some time, the officers board the ship before it enters the port, so the problems can be solved while the tug and pilot services manoeuvre the ship to the quay. A boarding clerk³⁸ boards the ship. The river police checks the crew and any possible passengers. In case of dangerous cargo aboard, this had to be mentioned to HCC before arrival, and the tonnage has to be declared. The cargo is controlled by surveyors under the authority of the receiver. The veterinary services check the quality when the cargo is meant for life animals. When all formalities are fulfilled, the stevedoor has to accept the work. When the stevedoor does not trust the quality of the commodity, he has to send a controller as well. The cargo also is controlled by surveyors under the authority of the receiver.

Before ship arrival the overseas agent sends the shipbroker a manifest and a copy of the Bill of Lading. Those documents are the basis of the Notify Address (3 copies), Freight List (1copy), Unloading List and Freight Note. Copies of the Notify Address are sent to the notify party and the consignee. Both the notify address and the consignee have to inform the shipbroker about the name of the receiver. The Freight List is sent to the boarding officer, maritime customs and pilots. One of the Unloading Lists is sent to the stevedoor, who compiles an Outturn Report on basis of this document. This Outturn Report is daily updated and the shipbroker sends this to the ship owner.

The Freight Note is sent to the receiver, who, after paying the bill, exchanges the original Bill of Lading for a Notify Address. The Bill of Lading is stamped, so it can not be traded anymore, and sent to the overseas agent, where it is filed. After arrival of the goods, the Notify Address is exchanged for the cargo, after payment of charges.

In the port of Rotterdam, many stevedoring companies operate, each of them is responsible for their own activities. A visit to European Bulk Services (EBS), the largest stevedoor specialised in dry bulk cargo, made clear how this stevedoor handles agribulk, the type of commodities which corresponds to the bulk handled by the grain terminal in Dar es Salaam. The equipment of the terminal where agribulk is transhipped can be found in box 3.1. In case of need, equipment from other EBS-owned terminals can be brought over, but this will hardly ever happen.

³⁷ Koninklijke Scheepsagentuur Dirkzwager, briefly Dirkzwager, registers all incoming and outgoing ships.

³⁸ In tramp shipping a boarding clerk is responsible for the clearance of goods (either inwards and outwards) and he keeps contact with the ship's agent. Clearance of goods is the responsibility of the ship's authority and the customs; the shipbroker manages the agent's affairs; so the boarding clerk assists the captain with the customs formalities on behalf of the ship broker. Arranging husbandry matters for the ship's company also belongs to the tasks.

Box 3.1

DISCHARGING/LOADING EQUIPMENT EBS	CAPACITY
• 3 SHORE BASED PNEUMATIC UNLOADERS	• UPTO 1,000 TON PER HOUR
• 1 PNEUMATIC FLOATING UNLOADER	• UPTO 1,000 TON PER HOUR
• 3 FLOATING GRAB CRANES	• LIFTING CAP. RANGING FROM 12-36 TON
• 2 FLOATING WEIGHING TOWERS	• FROM 750-1,250 TON PER HOUR
• 4 UNLOADING BERTHS	
• 2 RAILCAR/TRUCK LOADERS	
• 15 LOADING BERTHS	
• 1 SHORE BASED GRAB CRANE	• UPTO 1,750 TON PER HOUR

Discharging can start when all checks are done. The stevedoor and someone of the ship's management are present during the unloading and a tally clerk records the discharging. Within EBS two ways of discharging are known for agribulk. Sometimes a floating installation of cranes with grabs combined with floating weighing towers are used, sometimes pneumatic dischargers (a kind of large vacuum cleaners) are used. This system also exists both floating and at the quay side. The discharging equipment is used in all possible combinations. The quantity discharged is registered by an advanced computer controlled system. The two representatives of the ship and the receiver also record the quantity discharged. The last couple of years a shift in technique to the cranes is visible, as the pneumatic discharging is a very expensive and slow method, and this kind of discharging can not be used for all types of agribulk, as the commodity is crushed. But in case of combined loads in the same hatch, which are only separated by a thin plastic sheet, pneumatic discharging is the only way of unloading possible.

Delays in the discharging process can be caused by wheather conditions, damage to the ship, disturbance in the discharging equipment, late lighters. Other reasons are the quality of cargo, accidents with people or machines, disputes about quantity of load (draft survey) or with the creditor. The stevedoor, the ship management and the receiver record the delays. When a delay will cause waiting time for a ship which is expected to arrive, this ship is warned by radio. It will reduce the sailing speed and so save fuel.

Two kinds of unloading do exist: direct discharge overboard, and loading in sheds or at the quayside. Direct discharging overboard into barges happens most frequently. It means that the cargo from the seaship is brought to the receiver's transport mode, a coaster, lighter or barge. When discharging happens by means of grab cranes, the crane dumps the commodity into a weighing tower. After being weighed, the cargo is brought to a high placed dump point by reddler (a particular type of transport, by which the cargo is pulled through a tube) and thrown into lighter, barge or coaster. The floating material does not have a connection to shore, so discharging by means of floating material can only be used in case of direct discharging overboard.

In case of loading into the silo, the cargo discharged is weighed at scales which are situated before the silo. Transport to the weighing scales happens by means of conveyor belts. The weighing scales are computer controlled and precise to 1kg. From the weighing scales the cargo is transported to the silo bin of destination automatically. When the discharging happens from the quayside, the cargo might also be put into a train or truck. The commodity discharged is weighed by weighing scales which are placed before the discharging machines at the quay. From there the dry bulk is brought to a high placed throwing point from where the commoditie falls down in it's next mode of transport. This direct transfer hardly occurs in practice.

At further transport after storage, the commodity is weighed again and then brought to the final mode of transport. This transfer happens by means of a combination of reddlers or conveyor belts, which

transport the cargo to a high placed throwing point from which it falls down into the transport mode, most often a lighter or coaster, sometimes a train and very seldom a truck. In case of dumping in a train, the throwing point is fixed and the (computer controlled) locomotive moves the next wagon under the dumping place. So, delivery happens synchronically with discharging from storage.

When the agribulk is for transit, the forwarding agent is responsible for further transport. The bulk might not have a destination yet, so it has to be stored in the port. The transport from the port is most often organised by the receiver and sometimes by the seller.

The ship broker has to see that no cargo is delivered without the receiver having shown the relevant document. After collection of the arrival notice at the shipbroker, the receiver sets out for customs, to declare the document. This means that the document is provided with a number and the import duties and any possible excise taxes are to be paid. The receiver may collect his cargo if the document agrees with the facts written in the cargo list, the goods are debited from the cargo list and the receiver takes delivery of the goods in exchange of the arrival notice.

Handling outward cargo

When the forwarding agent books a load, a Certificate of Loading (6 copies), a Booking List (2 copies) and a Loading List (3 copies) are prepared. One copy of each document is filed by the forwarding agent. The copies of the Loading list are sent to the stevedoor and the ship. The copy of the Booking List is for the shipowner. When the stevedoor accepts the cargo, a copy of the Certificate of Loading is signed and filed by the forwarding agent. The shipbroker checks the cargo and signs a copy of the Certificate of Loading. After loading of the cargo, the three other copies are signed by the ship's representative. One is for the shipbroker and is used for inspection of the cargo. Another copy serves as a receipt for the ship and the last one is for the stevedoor. After receiving the Notice of Readiness, the loading can start.

When the cargo is booked, a Bill of Lading (5 copies) is compiled, stamped and numbered. One copy is used to compile a Cargo Manifest (4 copies), another copy is used to calculate the freight rate and to compile the Freight Manifest, which is sent to the overseas agent. The original Bill of Lading and two copies, to one the ship broker's Certificate of Loading is attached are sent to the agent.

The copies of the Cargo Manifest are signed by the ship's representative, who files one copy, an other copy is filed by the forwarding agent, and the last two copies are sent to the ship owner and the overseas agent.

Storage, forwarding, etc. belong to the responsibilities of the companies chosen by the ship's agent. RMPM does not mix in this business. Ship arrival procedures are similar to the ones described above. After ship arrival, all custom checks have to be done. The quantity of cargo loaded has to correspond with the Manifest. Most often, the cargo to be transhipped is transported to the port before ship arrival. Storage most often happens in silos, but if those are full, the commodity is put into barges. The quantity is registered by the automatised storage and unloading equipment and by the agent's representative. To clear the ship and the cargo, the ship's agent has to prove to the customs that the ship has export right and a destination. The customs of the country in which the goods are imported send a message to the customs in the port, to make sure that no goods get 'lost'.

Loading of sea ships is most often done out of the silo storage. The ship is berthed and the cargo is weighed with the same weighing scales as used with discharging. Then it is, with conveyor belts, brought to throwing points and from there dumped in the hatches. A representative of the buyer controls the loading process and the quantity loaded and takes a sample of the cargo for the receiver. When the loading is done from coasters or lighters, floating grab cranes are used, which dump the

commodity in the floating weighing tower. From there it is brought to a high place of throwing, from where it falls into the sea ship. Like during imports, all kind of combinations of equipment are used to load a ship. After finishing the loading, the ship can depart as soon as the port pilots have boarded.

3.3 DRY BULK HANDLING: THA-GRAIN TERMINAL

Description of the grain terminal

The grain terminal's activities are discharging, the bagging of bulk commodities either in the terminal and at the quayside and storage of the cargo. The silo comprises two receiving lines and two discharging lines, all of a capacity of 125 mt per hour. There are three mobile bagging lines with automatic weighing and sewing capacity of 40 mt per hour, ten trucks (DAF), a central truck loading point and a truck weighing bridge. In 1989, the grain terminal was built with help from the Dutch government. The storage capacity of the silo is 30,000 metric tons (mt) and consists of 24 main and 14 interstice bins. Each cell is self contained. The shed next to the silo can hold 1500 mt of bagged grain. Adjacent to the silo, a bagging plant is built, but this plant has been out of order for a couple of years now.

Between 1992 and 1993 an average of 110,000 mt of grain was handled by the terminal of which 55% was for the domestic and 45% was for neighbouring landlocked countries. From the forms to be found in appendix C-3 (silo operations and operations of bulk cargo bagged by THA/Nectar) it becomes clear that grain is the main commodity handled by the terminal, the last couple of years no sugar has been transhipped via this terminal and a maximum of 20% fertiliser on yearly basis. In 1995 no fertiliser has been transhipped at all.

Handling inward cargo

Every day the port management receives a daily shipping list. Before ship arrival the ship's agent Nasaco informs the port about the date the ship will call the port. Nasaco sends the Bill of Lading, the Manifest, the stowage plan and belonging hatch list, a dangerous cargo list, a list with all heavy lift cargo and a break-down of the cargo country by country to the port. A copy of the Bill of Lading is sent to the owner of the goods or his forwarding agent, who has to pay freight rates.

When the ship arrives at the port, it has to await daylight and the right tide. Especially large ships can only be handled at certain times because of the port's narrow and undeepest entrance channel. At the right tide the pilots board the ship and with help of tugs the ship is guided through the channel to the planned berth. At the berth the ship awaits the boarding officers, i.e. custom officers, immigration officers and health officers. The boarding officers check the documents and when this is done the discharging may start, as Nasaco sent a Notice of Readiness. If this Notice is not received, discharging officially can not start. In practice, this notice is often received very late and Nectar starts discharging without this notice.

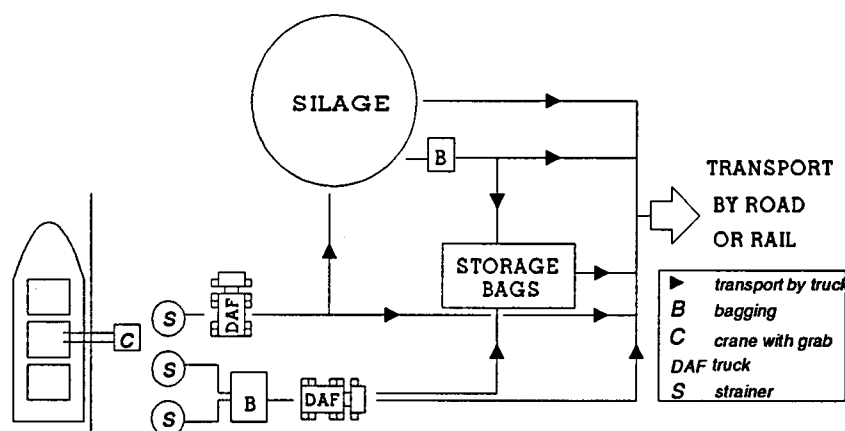
The ship's agent sends a copy of the Bill of Lading to the owner of the goods. The owner of the goods visits the ship's agent with the Bill of Lading and payment of the freight rates is checked. Then the forwarding agent goes to the Customs to fulfill the customs formalities and import entry and receives a declaration and disposal order (D&DO). These documents are sent to THA Revenue Office, for payment of port dues, where payment of port charges finds place. Then the D&DO is sent to the central documentation office, which matches the document with the ship's Manifest. One copy of the document is filed, another is given to the forwarding agent and the third is sent to the Delivery Office.

At the delivery office, the agent surrenders the D&DO for a Gate Pass, after signing the D&DO, to confirm that he has received the goods. Then the port can be left.

As soon as the ship has arrived, the weight of the cargo is checked by measuring the draft of the ship. This is done by a draft surveyor, appointed by the ship owner. In case of grain *and sugar* imports, a representative of the Food Department of the Ministry of Agriculture inspects the quality. In case of fertiliser, the Ministry of Agriculture inspects the quality of the cargo. A custom's officer should be present during the discharging but in practice is not. Times of delays and it's causes are noted by a representative of Nasaco and by Nectar, the bagging company. As Nasaco's representatives are only working during the day hours, the notes of Nectar are copied the next day. After finishing the unloading, the draft surveyor measures the draft of the ship again and the difference between the drafts before and after discharging indicates the weight of the cargo unloaded. After the discharging the ship has to wait for daylight and the right tide. The pilots and the tugs lead the vessel through the channel and the ship can depart. An overview of the discharging is shown in figure 3.1.

Figure 3.1

Overview of discharging process



The discharging of the grain is done by cranes with grabs. During discharging a tally clerk verifies the quantity of cargo received against the ship's Manifest. The grain terminal does not possess cranes but uses the ones owned by the general cargo terminal. The number of cranes operated during discharging depends on the ship, but if possible three cranes are used. Depending on the contract concluded, a part of the grain is bagged at the quay while an other part will stay bulk. The grain bagged at the quay is brought from the ship's hold to the hopper (a funnel) of one of the three bagging plants. Bagging is done in movable plants, which register the number of bags and their weight automatically. Although the number of bags produced should be counted during the bagging operation, in practice the figure at the machine, which also counts the number of bags, is read and registered. Every one hour a couple of bags are weighed manually, to check whether the balance of the plant is still correct. The bagged grain is loaded on the trailer by manpower, full trailers are temporarily stored in a shed. The grain terminal disposes one shed. When this one is full, other sheds, further from the quay side, have to be found and permission for storage has to be arranged. The final mode of transport depends on the destination of

the grain; when it is meant for foreign countries the transport will be done by rail. As the grain terminal is not served by one of the railway systems, all cargo is loaded on trailers. If the cargo is meant for a foreign country and wagons are available, the cargo will be transferred from the trailer to the wagons. Grain meant for Tanzania is transported by trucks. The removal of the cargo is the business of the importer. Nectar works out all data collected at the end of each ship handled. So does THA, but very often the figures collected by Nectar are used for the THA-reports.

The cargo which at the moment has to stay as bulk is put into hoppers by grabs. Trucks underneath the hoppers collect it. The full trucks drive to the weighbridge near the silo, where the weight of the cargo is registered. If the grain is to be stored in the silo, the trucks bring their cargo to the dump pit, from where it is automatically stored in one of the compartments. In case of direct delivery, the storage in the silo will be left out. The grain stored in the silo might be transported as bulk or be bagged later on. The bagging plant of the silo should be used to bag the stored grain, but as it has been out of order for the last few years, the movable bagging plants are used. In addition, the movable plants are cheaper in use than the one adjacent to the silo.

No figures are available concerning the average storage time in the silo. Officially, the first 10 days storage after finishing the discharging are free of charge. With World Food Program (WFP) a free storage period of 60 days is agreed. From then on a fee is charged of US\$1.- per mt per day. In practice THA does not charge for the silo facility and especially WFP stores its grains for long periods.

For the administration of the grain terminal, the weight loaded in and discharged from the silo is calculated by clerks who note the figures on a form and calculate the difference. The operation officer uses the figures to fill in the Daily Report on Silo Operations and the Silo Cargo Plan, to keep in touch with the quantity of grain in the silo. The last two forms are filed in the operation officer's office.

Handling outward cargo

In practice no dry bulk commodities are exported via Dar es Salaam port. Bagged commodities are shipped via the general cargo terminal, so the grain terminal does not deal with exports of grain, nor with the documentation. However, the grain terminal's procedures are the same as those of the general cargo terminal, as the grain terminal is a more or less independent part of that terminal. The described goods flow and belonging documentation are deduced from the general cargo terminal procedures.

Before outward cargo will be received by the port, Nasaco sends a letter to THA export office with a general description of each shipment of cargo, the shipping order number, weight of shipment, name and expected time of arrival of the vessel, the country of origin and port and country of destination. The export office prepares an Export Acceptance and Shipment form (EAS) on basis of this letter, just prior to the receipt or loading of the cargo to the ship, a Loading List is compiled by the export office as well. The Loading List and the EAS-forms and copies of the Shipping Order are forwarded to the records clerk, responsible for the grain terminal. The records clerk issues the EAS form to the tally clerk, who is assigned to record the cargo receipt and loading. All port charges for outwards cargo must be paid in advance of the receipt and loading. After completion of loading of cargo to the ship, the records clerk presents the Shipping Orders and EAS forms to the vessel and obtains the captain's signature for receipt of the cargo which has been loaded. The export office uses the Shipping Order and EAS form to prepare an Outturn Report, of which copies are issued to customs, Nasaco and the THA revenue office as confirmation of the quantity and condition of cargo which was actually loaded.

As soon as the cargo is received at the port, it will be inspected by customs and then be stored in the terminal, where it awaits the ship's arrival. When the ship has arrived and all formalities are fulfilled, the cargo is brought to the quay side and loaded in the vessel.

When the ship has arrived and the formalities are passed (see inwards cargo), the loading can start. The bulk cargo will be discharged from the silo, dumped in trucks which are weighed at the weighing bridge and drive to the quay side. Grab cranes will transfer the cargo and after completion of the loading, the ship has to await daylight and the right tide, before pilots board and the ship departs.

3.4 ANALYSIS DRY BULK HANDLING BENCH MARK ORGANISATION AND THA

In table 3.3 all differences and similarities regarding handling of dry bulk cargo in the ports of Rotterdam and Dar es Salaam are summarised.

Table 3.3

Dry bulk handling in ports of Rotterdam and Dar es Salaam differences and similarities		
	Port of Rotterdam	Dar es Salaam port
ship arrival	<ul style="list-style-type: none"> • no entering restrictions • in case of delays which influence next ship, this ship is warned by radio; fuel can be saved by reducing speed • pilots enter ship when still sailing • customs and other officials enter after berthing 	<ul style="list-style-type: none"> • await right tide in connection with depth entrance channel • await daylight in connection with working hours pilots • customs and other officials enter after berthing
discharging and storage inward cargo	<ul style="list-style-type: none"> • veterinary service (in case of grain) and river police enter after berthing • discharging may start after receipt of Notice of Readiness • discharging, bagging and storage by private stevedoor • grab cranes preferred, only when needed, pneumatic discharging • cranes partly computer controlled • bagging happens after storage, just before delivery • weighing happens automatically • from discharging, further transport happens automatically; either to silo or next transport mode; terminal is rail served • transport from silo to next transport mode happens automatically; the cargo is weighed again • process is capital intensive rather than labour intensive • enough storage space for dry bulk available; either in silo's or barges 	<ul style="list-style-type: none"> • custom officers and health officers (in case of grain) and immigration officers enter after berthing • discharging should only start after receipt of Notice of Readiness, but often starts without this notice • discharging and bagging co-ordinated by private stevedoor, silo owned by THA • grab cranes • cranes controlled by manpower • bagging happens at quay side, direct after discharging • weighing happens straight after bagging or before storage in silo • transport to silo by trucks, straight delivery happens very seldom • discharging from silo by dumping cargo in trucks, in case of rail wagons, transfer from truck to wagon needed • process is labour intensive, labourers are given incentives for their performance • enough storage space for bulk cargo, grain terminal itself has not enough space for storage of bagged cargo. other sheds have to be found and permission to use them

Dry bulk handling in ports of Rotterdam and Dar es Salaam
differences and similarities

	Port of Rotterdam	Dar es Salaam port
documentation inward cargo	<ul style="list-style-type: none"> Manifest and Bill of Lading are basis for port procedures, Freight Note is document which can be surrendered against Notify Address. After payment of freight rates, duties and taxes, it can be exchanged for goods 	<ul style="list-style-type: none"> Manifest and Bill of Lading used to prepare document (D&DO), which, after payment of freight rates, duties and taxes, can be surrendered Gate Pass. After arrival, Gate Pass can be exchanged for goods
storage and loading outward cargo	<ul style="list-style-type: none"> there is outward cargo outward cargo mostly bulk storage in silo before loading custom check before loading discharging and weighing at once automised transport to next mode of transport (conveyor belt, etc.) loading may start after receipt of Notice of Readiness cargo dumped from belt into ship 	<ul style="list-style-type: none"> currently no outward cargo outward cargo would be bulk only storage in silo before loading customs check before loading weighing cargo after discharging transport silo to quay by trucks loading may start after receipt of Notice of Readiness loading by grab cranes
documentation outward cargo	<ul style="list-style-type: none"> Booking List and Loading List are sent to prepared by forwarding agent Certificate of Loading is given by customs Outturn Report 	<ul style="list-style-type: none"> facts send by Nasaco are same facts as mentioned on Booking List and Loading List in Rotterdam Export Acceptance and Shipping (EAS) form is given by customs (in fact Certificate of Loading) Outturn Report is same as in Rotterdam
departure	<ul style="list-style-type: none"> no limitations departure with pilots aboard 	<ul style="list-style-type: none"> await daylight await right tide departure with pilots aboard

In Dar es Salaam, between ship arrival and the first grab of discharging much time is lost due to waiting time for the right tide and day light and procedures which only start after berthing. The first two causes can not be helped overnight, but the procedures could start when the ship is waiting for the right tide, so discharging could start immediately after berthing. In both ports discharging may only start after receipt of a Notice of Readiness, given by the ship's agent. Discharging by grab cranes is common, although in Rotterdam sometimes pneumatic machines are used. The transport of bulk cargo from the ship to the silo or next mode of transport in Rotterdam happens by conveyor belts and reddlers, while in Dar es Salaam trucks are used. In Dar es Salaam, bagging happens at the quay side, straight after discharging and after silage, while in Rotterdam the cargo is only bagged after storage. In Rotterdam the discharging process is largely automised, while in Dar es Salaam many workers are involved. Both terminals have at their disposal enough silo space. In Dar es Salaam, the grain terminal management in practice does not charge the users for silo space. The bagged bulk is stored in sheds and the terminal's capacity to store bagged bulk is limited. Other sheds, probably far from the quay side, have to be found and permission for storage has to be arranged. In practice no outward good flows of dry bulk cargo exists in Dar es Salaam, so the described procedures are not real. Most facts are deduced from the general cargo procedures. No remarks have to be made regarding ship departure.

The documentation flow in both ports hardly differs: under other names, the same documents are prepared. The documentation procedures of the grain terminal are simple and work effectively. But the documentation and information is being operated manually, so the procedures are labour intensive and time consuming.

The slow removal of bagged commodities causes congestion in the port. The cargo is stored in sheds belonging to the general cargo terminal, where it blocks these sheds. Although the congestion is not caused by THA, the consequences are for the port.

3.5 PERFORMANCE INDICATORS

According to a report of the United Nations Conference on Trade and Development (UNCTAD), congestion is mostly not caused by the ports but by more cargo coming into the port area than goes out for a long time.³⁹ Causes of the congestion are inadequate transport, delays caused by Customs and government departments, lack of adequate warehousing facilities outside the port area and importers' financial problems. Although port authorities are not responsible for collecting cargo from their ports but the importers, it does benefit the port to encourage a smooth flow of cargo. Congestion in a port causes problems as the working space in sheds and open storage areas becomes limited. The sheds will be overstowed which causes a risk to damage the cargo and mechanical equipment can not move freely anymore. This results in delay of loading or unloading which affects the turn-round time. Port performance indicators can be used to measure and compare the efficiency of various aspects of the port's operation. They should provide insight to port management into the operation of key areas and, therefore, they should be easy to calculate and simple to understand. Performance indicators can be used to compare the real performance with the target and to detect a trend in the port's performance. All inputs in a process (land, capital and labour) should be set out in standards in such a way that the relation between input and output (i.e. productivity) becomes clear. As a port authority deals with the overall responsibility for the functioning of the port, a well-balanced set of performance indicators will help to collect the right data in stead of collecting a lot of superfluous data.

Performance indicators of the United Nations

According to the UNCTAD⁴⁰ a set of indicators should exist for each category of cargo since the port provides different facilities according to the way cargo is handled. The suggested cargo categories are break-bulk general (or conventional) cargo, unitized cargo, liquid bulk and dry bulk like ore, grain, cement and fertilizer. Two kind of performance indicators are to be distinguished: the financial and the operational ones.

The *financial performance indicators* only take into account the costs and revenues associated with the transfer of cargo to or from ships in the calculation of the various indicators. Thus cost and revenue generated from the transit storage and warehousing function and from the delivery and receipt of cargo via these storage areas are excluded. This decision is based on the fact that cargo handling to or from vessels takes place during a well-defined period of time, the time when the ship is at berth, while for the same ship the delivery of discharged cargo from storage areas within the port can extend over a period of months. Thus a separate group of indicators should be developed for the transit storage and warehousing areas that are not linked to the particular ship call. The port area should be divided into berth groups which are areas or sub-areas, each handling a different cargo class. The important elements per berth group are:

- ship revenue related to the berth group
- cargo revenue related to the cargo handling; services of the berth group
- labour costs
- capital equipment costs

The ship revenue originates from berth occupancy charges or port dues.

An extremely important indicator, financially as well as operationally, is the monthly volume of cargo handled. The following indicators should be calculated each month for the ships sailing from each berth group:

³⁹ United Nations Conference on Trade and Development, *Manual on a uniform system of port statistics and performance indicators* (Geneva: UNCTAD, 1983, p. S.13).

⁴⁰ United Nations Conference on Trade and Development, *Port Performance Indicators* (Geneva: UNCTAD, 1976, p.3).

Table 3.4

Financial port performance indicators	
Financial Port Performance Indicator	Definition
<i>total tonnage worked</i>	total tonnage worked in a certain period (<i>a year</i>)
<i>berth occupancy revenue per ton of cargo</i>	total berth occupancy revenue produced, divided by tonnage worked <i>used definition: harbour dues divided by tonnage worked</i>
<i>cargo handling revenue per ton of cargo</i>	total revenue produced from transferring cargo to or from ships, from or to storage areas, divided by tonnage worked <i>used definition: total operating income divided by tonnage worked</i>
<i>labour expenditure per ton of cargo</i>	total direct labour expenditure for transfer of cargo to or from ships, from or to storage areas, divided by tonnage worked <i>used definition: total direct labour expenditure divided by tonnage worked (direct labour expenditure unknown)</i>
<i>capital equipment expenditure per ton of cargo</i>	total amortization and interest allocated to and maintenance and operating costs incurred for the berth group, excluding the costs of transit sheds and warehouses, divided by tonnage worked. <i>used definition: total expenditure minus personnel costs divided by tonnage worked</i>
<i>total contribution</i>	berth occupancy and cargo handling revenues minus labour and capital equipment expenditure <i>used definition: net result profits and loss account</i>
<i>contribution per ton of cargo</i>	total contribution divided by tonnage worked

Important *operational information* to maintain is the number of ship arrivals and a breakdown of the ship's time in port for each class of cargo. These data are of prime concern to the ship owners and operators for the setting of freight rates and thus of direct concern to shippers and consignees who must pay the freight rate. Perhaps the most complicated and intricate problem existing in the transport field today, is the turn-round time of ships in ports. An excellent indicator to maintain port effectiveness is the quantity of cargo worked per ship hour in port. To maintain this indicator, information on the arrival time, departure time and tons loaded/discharged for each ship must be recorded. In addition, the time of berthing, ship length and location of berthing should be noted. The various ship times must be accurately defined and then consistently recorded. In addition to the above information, data on the total hours at berth during which the ship was worked and on the total gross gang-hours worked should be recorded, to permit measurement of the intensity of working. From these records the following averages can be calculated on a monthly basis for each berth group servicing a cargo class:

Table 3.5

Operational port performance indicators	
Operational Port Performance Indicator	Definition
<i>arrival rate</i>	number of ships arriving during a month, divided by number of days in the month
<i>waiting time</i>	total time between arrival and berthing for all berthing ships, divided by number of berthing ships
<i>service time</i>	total time between berthing and departure for all ships, divided by number of ships
<i>turn-round time</i>	total time between arrival and departure for all ships, divided by number of ships
<i>tonnage per ship</i>	total tonnage worked for all ships divided by number of ships
<i>fraction of time berthed ships worked</i>	total time that berthed ships were actually worked, for all ships, divided by the total time between berthing and departure of all ships
<i>number of gangs employed per ship per shift</i>	total gross gang time, divided by total time that berthed ships were actually worked, for all ships, divided by the total time between berthing and departure of all ships
<i>tons per ship hour in port</i>	total tonnage worked, divided by total time between berthing and departure
<i>tons per ship hour at berth</i>	total tonnage worked, divided by total time between berthing and departure
<i>fraction of time gangs idle</i>	total idle gang time, divided by total gross gang time

Performance indicators of port of Rotterdam and Dar es Salaam: an abortive comparison

Neither the ports of Rotterdam nor Dar es Salaam port, use the above described performance indicators. Nevertheless, most financial indicators could be deduced from other sources. But many of the operational indicators could not be found. RMPM only provides facilities, so many of the indicators fall outside the management's area of influence. Not RMPM, but single, independent companies are responsible for the performances. At Dar es Salaam port, many operational figures are recorded, but not the ones needed to fill in table 3.5. For the grain terminal, some of the lacking figures could be deduced from 9 Statements of Facts. All figures are converted into US\$. In table 3.6 and 3.7 the indicators found are presented.⁴¹

⁴¹ Sources: Rotterdam Municipal Port Management, *Annual report 1995*, Port of Rotterdam (Rotterdam: RMPM, 1996); Directie Haveninnovatie, *Trendrapport 1994*, Port of Rotterdam (Rotterdam: HavenInformatieBank DHI033/94, 1994); Tanzania Harbours Authority, *Annual report 1992/1993* (Dar es Salaam: THA, 1994); Tanzania Harbours Authority, *Operations of bulk cargo bagged by THA/Nectar at shore side/silo 1995*, (Dar es Salaam: THA, 1996); Tanzania Harbours Authority, *Silo operations 1995* (Dar es Salaam: THA, 1996); Unpublished information given by relevant departments in Dar es Salaam port.

Table 3.6

Financial port performance indicators			
Financial Port Performance Indicator	Port of Rotterdam ² 1995 (\$1=f1,60)	Dar es Salaam port 1993 (\$1 = Tsh 452)	Grain terminal DSM 1995
<i>total tonnage worked</i>	294,300,000	4,840,800	300,100
<i>berth occupancy revenue per ton of cargo</i>	\$ 0.89	not available	not available
<i>cargo handling revenue per ton of cargo</i>	\$ 1.44	\$ 12.12	handling U\$ 8.- bagging U\$ 5.-
<i>labour expenditure per ton of cargo</i>	\$ 0.22	\$ 3.19	\$ 1.06 ³
<i>capital equipment expenditure per ton of cargo</i>	\$ 1.11	\$ 6.17	not available
<i>total contribution (net result)</i>	\$ 28,769,375	\$ 7,170,600	not available
<i>contribution per ton of cargo</i>	\$ 0.10	\$ 1.48	not available

¹ Source: Bank of Tanzania, *Economic Bulletin of the quarter ended 31st December 1995*, Vol. XXIII, no. 2, rate exchange bureaux; ² THA only has one common Balance Sheet and Profits and loss account, so all figures represent an average of THA, not of Dar es Salaam port; ³ Labour costs paid by THA; Nectar also pays for labour

Table 3.7

Operational port performance indicators			
Operational Port Performance Indicator	Port of Rotterdam	Dar es Salaam port	Grain terminal DSM
<i>arrival rate</i>	767 / day	13 / day	0,05/day
<i>waiting time</i>	not available ¹	12 hrs ²	not available
<i>service time</i>	not available ¹	not available	166 hrs ³
<i>turn-round time</i>	not available ¹		not available
deep sea general cargo		4.6	
deep sea tankers		3.3	
dry cargo coasters		2.3	
tanker coasters		2.3	
<i>tonnage per ship</i>	1050	1050	13,100 ³
<i>fraction of time berthed ships worked</i>	not available ¹	not available	75 % ³
<i>number of gangs employed per ship per shift</i>	not available ¹	not available	3 ³
<i>tons per ship hour in port</i>	not available ¹	not available	not available
<i>tons per ship hour at berth</i>	not available ¹	not available	79 ³
<i>fraction of time gangs idle</i>	not available ¹	not available	25% ³

¹ not available as RMPM is not responsible for these performances; many independent companies deal with them; ² estimation (depending on volume ship waiting time varies between 6 and 15 hours, rapidly increasing with growth of volume); ³ based on only 9 statements of facts, for summary also see appendix C-3.

The cargo handling revenue per ton of cargo in Dar es Salaam is a multitude of Rotterdam; so are the labour and capital expenditures. Also the contribution per ton of cargo in Dar es Salaam is higher than in Rotterdam. Some remarks should be made. The exchange rate of the Tanzanian shilling (1993) is not charged for the market rate, although the rate calculated with is the one used in exchange bureaus, it is still not a realistic exchange rate. Although salaries and wages in the Netherlands are much higher than in Tanzania, the Tanzanian labour expenditures per ton of cargo are higher. In Rotterdam port much equipment replaces the work which is done manually in the Tanzanian ports. As in Rotterdam no equipment owned by stevedores is taken into account, it might be presumed that the capital equipment expenditure per ton of cargo in reality is much higher than the figure found in the table. Hardly any of the operational performance indicators could be included in the table, but for the arrival rate and tonnage per ship. The arrival rate of Rotterdam port accounts 60 times the rate of Dar es Salaam. Surprisingly, the tonnage per ship is equal in both ports, although the port of Rotterdam can receive the largest sea ships. The number of small ships calling Rotterdam amounts to eight times the number of sea ships (see §3.1) and probably compensates the volume of the large sea ships. There are several reasons why the tonnage per ship calling for the grain terminal is much higher than the average figure of Dar es Salaam. Most dry bulk is delivered by deep sea ships, while the other terminals also receive coasters which bring cargo either inwards or outwards. The dry bulk is only coming inwards, further distribution happens by land transport.

The ports can not be compared without some consideration: Rotterdam port is the world's largest port (measured in tons transhipped) and serves an enormous and rich hinterland, while Dar es Salaam is situated in a poor part of the world. In Rotterdam the number of ship calls is much higher than in Dar es Salaam. Also, the port of Dar es Salaam is almost only used for transshipment, against the port of Rotterdam, which also includes industrial activities. The port of Dar es Salaam is a state owned enterprise and all tasks, but discharging of dry bulk, is performed by civil servants. RMPM is not responsible for port operations and, therefore, not responsible for expenditures made for those operations (like wages and salaries for labour, and depreciation of stevedoring equipment). The contribution per ton of cargo in Rotterdam is the total contribution divided by the tonnage worked in Rotterdam port. It does not include the contribution earned by the stevedoring companies. In Dar es Salaam, where only one independent stevedoor is active in a small part of the port, the figure (US\$ 1.48) comprehends the overall contribution, inclusive the contribution earned by stevedoring activities.

Performance indicators within THA

In 1994 a performance contract between THA and the government was concluded. The contract is a formal statement of intentions and obligations between the government and THA. It aims at promoting best performance of THA consistent with its role and objectives as a state owned enterprise with built-in mechanisms for assessing fairly the performance of THA which, depending on the results, will earn THA management appropriate rewards. The performance measures are separated in two groups: financial performance and port operations and quality of service. For the port of Dar es Salaam, the unit costs are also a performance indicator. In table 3.8 the indicators are summarised.

Table 3.8

Performance indicators performance contract THA and government	
<i>financial</i>	<ul style="list-style-type: none"> • return on capital employed • pre-tax profit margins
<i>operations and quality of service</i>	<ul style="list-style-type: none"> • productivity: general cargo (tons/gang/shift) container (moves per 24 hours) • ship turnaround (days in port) general cargo; container
<i>unit costs</i> (DSM only)	<ul style="list-style-type: none"> • ship costs: marine per ship stevedoring: general cargo, containers • shipper costs: shore handling: general cargo, containers • wharfage

As stated at the beginning of this paragraph, a set of port performance indicators should be supportive for the port management to create insight in the actual port performance. All inputs in a process (land, capital (material inputs) and labour) should be set out in standards in such a way that the relation between input and output (i.e. productivity) becomes clear. A well-balanced set of indicators, should give compact information which is easy to understand, without superfluous facts.

The performance indicators used in the performance contract are not specifically enough for the headquarters management. The figures do not give insight in the port's performance: the indicators are only overall figures and do not reflect the financial situation or operational input against the work performed. For this reason, the financial indicators should be supplemented with more detailed figures. The UNCTAD-indicators could be used for this, as those indicators fulfill the demands described above. The same argument is valid for the operational indicators: supplementation is needed to give insight in the performance. For example, the turn-round time is given, but the waiting time and service time are unknown. The UNCTAD-indicators could be used as a basis for the supplement. But it would also be interesting to get some insight in the time taken by the formalities (customs, health, etc.). For each procedure the average time span should be measured.

3.6 LOGISTICAL ANALYSIS GRAIN TERMINAL

With help of a logistical analysis of the grain terminal's discharging procedures, the second research question, how to improve the terminal's cargo throughput, could be answered. In this paragraph the scope of logistics which could be of use for the grain terminal is given.

Within logistics, a dichotomy exists between physical distribution management and materials management. Material management takes up the traject from the supplier of raw materials upto the finished product and the course from there untill the product is consumed belongs to the physical distribution management. It is clear that the grain terminal's activities fall under materials management. Van Goor *et al* distinguish four segments within material management: purchase and acquisition, stock management, production planning and materials handling in which decisions have to be taken.⁴² The category purchase and acquisition in this division concerns the choice of suppliers, purchase of raw materials and semi manufactured products. Stock management concerns the

⁴² Goor, A.R. van, Kruijtzter, A.H.L.M., Esmeijer, G.W., *Goederenstroombesturing, voorraadbeheer en materials handling*, (Leiden/Antwerpen: Stenfort Kroese, 1990, p.17).

management of the purchased materials from the warehouse until the central warehouse, where the finished products are stored. With production planning is meant the material requirement planning, acquirement of orders and management of the production process. Materials handling is the transport within the process, the handling of raw and semi manufactured materials until they are stored as finished product. This model is used to create an overview of the tasks and the responsables within the discharging process of the grain terminal. As discharging is not an ordinary production process in which a product is manufactured from raw materials, it can be concluded that the category purchasing and acquisition is not present in the proces. Preparation of the raw materials normally belongs to the materials handling. In case of discharging ships, this category is not satisfying, as guidance of the ship and fulfilling all formalities can not be done by the stevedoor or the grain terminal's management. For this reason a segment is added, called production preparation. So also within the grain terminal's logistics, four segments are known. In table 3.9 the segments and their responsables are mentioned in sequence of the process.

Table 3.9

Materials management decisions		
segment	meaning within discharging process	responsibility within grain terminal
production preparation	pilotage, fulfilling formalities	THA, customs and ministries
production planning	management of discharging, storage and possibly bagging	Nectar
materials handling	handling of discharged grain till storage	Nectar/THA
stock management	storage after discharging	THA

In fact, the bagging process is a special kind of production process, in which decisions regarding production planning, material handling and stock management have to be taken. The raw material is bulk grain in a ship and the finished product is discharged grain, either in bulk or in bags. Both production planning and materials handling are involved in this. Nectar is responsible for both sections. Besides, discharging and bagging, another product is sold by the terminal: storage space for bulk cargo. The responsibility for storage falls under the authority of the THA-management. The intake of cargo in the silo still belongs to the first two categories and is supervised by Nectar.

Possible methods to improve the goodsflow

The terminal's goods flow in fact is a production process. For the improvement of this kind of processes, several approaches exist. Three classical ones and a newer one are summarised and discussed below, and a choice for the best approach applicable to the grain terminal is made.

The first classical approach relates to the decisions regarding goods co-ordination of parts and of the finished products. This method is known as *Material Requirements Planning (MRP-I)*. With help of this technique several production stages are steered by the demand for finished products. A bill of materials is used to translate the, by the market ascertained, demand for finished products to the dependent need of raw materials and semi manufactured products. So the market demand is the starting point, from there it is calculated what finished products have to be produced at a certain time. Next step is to calculate when the semi manufactured products have to be produced and when raw materials and components have to be ordered. The technique takes stock, work in process and flow times into consideration. MRP was developed to steer a proliferation of product variances with many parts.

Disadvantage of MRP-I is the one way traffic: in the calculations which translate the demanded finished products to raw material needs the capacity requirement and availability are not taken into consideration. *Manufacturing Resources Planning (MRP-II)* was developed to solve this problem. This addition to MRP-I translates the market demand in a production planning for the finished products.

The second approach is developed at Toyota and is known as *kanban* or *Just in Time (JiT)*. It is a method which concentrates on streamlining of the primary process and searches for improvements in the process to simplify the process management, to decrease the flowing times and to reduce the stocks, especially work in process. JiT is developed for production of large quantities with relatively little variances. Year after year small improvements are realised on an existing production system. The system started out of the need to work with scarce means (materials, location, etc.) and to become competitive in the existing world markets. The system is developed to create a 'mix-flexibility', which means that different products can be manufactured. JiT helps to simplify the steering of the production process. It is a pull-theory : the production of finished products needs semi manufactured products; production of semi manufactured products needs supplementing stocks of raw materials, etc. In the JiT system, stocks of work in process are taken away, so disruptions can be seen clearly, which should motivate the employees to solve the problems. Total quality control is the basic assumption, which is being realised by making the employees responsible for undertaking action in the production process in case of trouble. Also improvements of the system have to be invented by the employees. The most important goals of JiT are productivity increase and reduction of setups and stocks of work in process, a more market tuned production and increase of flexibility.

The third classical approach focuses on capacity problems and not on the goods, and is known as *Optimised Production Technology (OPT)* or *Theory of Constraints (ToC)*. With ToC, the theory is meant and OPT is the belonging software system. In fact, in the theory the good points of both MRP and JiT are combined with new ideas. The theory starts with the point that the only real goal of a production company is making money and, for that reason, the whole company should be designed to meet this goal. Net profit, return on investments and cash flow express the extent to which the goal of making money is reached. Increasing throughput, decreasing inventory (all the money that the system has invested in purchasing things which it intends to sell) and decreasing operational expenses influence the goal positively and for that reason should be reached. As the bottle necks determine the production, the use of those bottle necks should be optimised. All other capacities are subordinated to the bottle necks. The non-bottle neck resources rather not function all the time, as this will create stock of work in process. The overcapacity on the non-bottle neck resources is needed to help the bottle necks producing optimal and to plan the goodsflow. The MRP system is used to calculate the requirements and the use of the other capacities.

A new steering concept, known as *Method of Integral Steering (MIS)*, is developed by Hoekstra en Romme.⁴³ Integral steering means planning and control of the total goods flow from delivery of raw material and semi manufactured parts till delivery at the customers. The method can be used for processes of all kind of complexity: in between input and output of the traject a complex production and delivery system or a simple storage and distribution system and everything in between can be found. The theory is focused on enlarging a company's flexibility by pushing back stocks as far as possible in the process, so all client specifications (i.e. products and delivery time) can be met without keeping much stock. The places in the process where stock has to be kept, are called uncouple points. So, only when customers demand products, the goods needed for the production are given free from those uncouple points. To determine the places of the uncouple points the demanded delivery time is weighed against the flow time. This means that the place of the uncouple points is determined by the demanded delivery time: when customers expect receipt within 14 days, the flow time from the uncouple point until delivery should be 14 days at most. If it is more, the uncouple point should be

⁴³ Hoekstra, Sj., Romme, J.H.J.M., *Op weg naar integrale logistieke structuren* (Deventer: Kluwer, 1985).

situated more to the end of the process, so the materials stocked will be stocked more processed than before. If the flow time is less then the demanded time, the uncouple point should be placed more backwards in the process. Advantage of this method is that particular specifications can be met without keeping all kinds of varieties of the product in stock.

Not all theories are applicable to the existing situation within the grain terminal. The MRP system was developed for complex production processes. Calculations are made to find the quantities of raw materials and semi manufactured products needed. In case of the grain terminal, the market demand is exactly known, as the raw material is delivered by the client. No semi manufactured products are needed, so extensive calculations are unnecessary. For this reason, the theory is not a (first) choice for the grain terminal. JiT is a method which requires initiatives from the employees. From observations it became clear that employees within the terminal did not show initiatives easily, even when requested. Experiences with JiT showed that a strong hierarchy and belonging status aspects will restrict the functioning of the system.⁴⁴ However, the THA-grain terminal is a strongly layered organisation. (In paragraph 3.7 these remarks are studied in some depth.) For these reasons, the JiT-theory is not applicable to the terminal. The ToC method is a theory which sticks to a company's basic goal: making money. Efficient use of the available capacities is a way to reach this goal. The theory can be applied to each production organisation, so also to THA and the THA-grain terminal. According to Gelders and Van Wassenhove, most principles of ToC can also be found in the JiT-theory.⁴⁵ But those principles can not be found explicitly within this theory: JiT is a method of trial and error, while ToC is more structured. As THA's grain terminal should become more commercial, it could be useful to apply the ToC to the grain terminal. The method of integral steering can not be applied to the grain terminal, as the terminal has a very special production process. No stocks are kept for unexpected market demand, as clients deliver cargo themselves to the terminal. So the uncouple point is already put back in the production process as far as possible. Production only starts when the client asks for it, which is at the ship's arrival. For this reason, the system of integral steering can not be applied to the grain terminal.

The Theory of Constraints is the best solution for the grain terminal. In the following, this theory is elaborated upon.

Theory of Constraints

The Theory of Constraints (ToC) is a logistical theory of ongoing improvement, developed by Goldratt and Pazgal and explained in a well known book.⁴⁶ The first principle of the theory is that the goal of each (commercial) company is generating money, both now and in the future. All actions undertaken in the company are subordinate to this goal. So not reducing costs, but making money is the goal of the company. Although this all seems very logical, in the past many managers did not act according to this principle. Realising that the goal is to make money, three common measurements have to be redefined:

<i>throughput:</i>	the rate at which the system generates money through <i>sales</i>
<i>inventory:</i>	all the money that the system has invested in purchasing things which it intends to sell
<i>operational expense:</i>	all the money the system spends in order to turn inventory into throughput

⁴⁴ Sluis, L., *JIT and TOC: uitwisseling van ideeën en implementatie-ervaringen*, (Deventer: Kluwer Bedrijfswetenschappen, Tijdschrift voor Inkoop en Logistiek, 1993, p.34-40).

⁴⁵ Gelders, L., Wassenhove, L. van, *Productiebesturingssystemen: een vergelijking van MRP, Kanban en OPT* (Antwerpen: Economisch en Sociaal Tijdschrift, volume of 1984, no. 6, p.665-677).

⁴⁶ Cox, J., Goldratt, E.M., *The goal; a process of ongoing improvement* (Worcester: Gower, 1989).

Those measurements are very different from the traditional definitions, because Goldratt believes that it is better not to take the value added into account. This eliminates the confusion over whether a dollar spent is an investment or an expense. Everything managed in an organisation is covered by those measurements. When the pace of the throughput increases, the net profit, the return on investment and the cash flows increase as well. A decreasing inventory and a decrease of the operating expenses also both cause an increase of those three performance indicators. So it is important to control those.

A company only has two types of capacities: bottle neck capacities and non-bottle neck capacities. A capacity resource can be a machine, a person, tools, space, etc. Each company only has a few bottle necks. Those bottle necks restrict the goods flow and have to be kept working as much as possible. The non-bottle necks have superfluous capacity which can be used to make a planning more flexible. It is not useful to use those non-bottle necks full time, as this will create more inventory, and so work against the goal. The first two rules of ToC are clear now:

- the utilisation of a non-bottle neck resource is not determined by its own potential, but by some other constraint in the system
- activating a resource is not synonymous with utilising a resource

In traditional theories, setup times are seen as lost time and decreasing the turn over. ToC explains that setup time is only lost time at a bottle neck, as during the setup the goods flow can not continue. So setups have to be avoided at bottle neck machines. But at non-bottle neck machines, setup time is not lost time as those machines have superfluous capacity. In fact, as long as the costs of labour and material are not high, a non-bottle neck machine should be setup as much as possible. This will not affect the goods flow, but small batches decrease the work in progress and so decrease the operational expenses. This gives the next two rules of the theory:

- an hour lost at a bottle neck is an hour lost for the total system
- an hour saved at a non-bottle neck is a mirage

The traditional economical lot size formula weighs setup costs against stock costs. But an hour less spent for setup is only valuable for bottle necks. Second point of criticism is that stock costs are paid per item, while setup costs are for the production capacity. Within ToC two kinds of lot sizes are known: a transfer lot size, the batch which is transported to the next capacity resource, and a process lot size, which is the quantity of the batch which is processed. The process lot size depends of priority, available capacity, etc. So the process lot size has to be adapted to the situation of that particular moment. This is the basis for the next two rules:

- the transfer batch may not and many times should not be equal to the process batch
- a process batch should be variable and not fixed

Traditionally, priority and capacity are approached sequentially. The part with the longest flow time is planned to be made first and only then capacity is considered. So priority and capacity are not approached sequentially and unrealistic planning can take place and discrepancy between the output of calculations and reality. The seventh rule is therefore:

- capacity and priority need to be considered simultaneously and not sequentially

Other theories presume that operating times capacities vary, but that adding up all averages of operating times will give the total flow time. This would be true, if all operations were independent. But in practice, sequential steps in a process are not independent and large deviations can arise. The existence of unsteadiness which can work cumulative, has to be admitted, so the unsteadinesses can be isolated and minimised. This is meant with the eighth rule:

- Murphy is not an unknown, and his damage can be isolated and minimised

As unsteadiness will always exist, it is better to keep capacity differences, so the constraints are easily to be identified and planned. If possible, bottle necks should be situated in the front of the production process. Bottle necks in the last stage might create stock of work in process. And of course,

interruptions at bottle necks should be avoided. So safety stock or safety times have to be put before the bottle neck, so these will never be idle because of disruption of a delivery capacity. This is all summarised in the next rule:

- plant capacity should not be balanced, the flow should be balanced

The last rule concerns the accounting standards: as each hour saved at a non-bottle neck is a mirage (rule 4), no rewards should be given for the classical efficiency principles, which measure the number of operating hours and non-operating hours. For the goal, the generating of money, the occupation degree of non-bottle necks is of no interest. So rule ten has to be taken seriously:

- the sum of local optimums is not equal to the optimum of the whole.

Summarising, balancing the flow is the only way to reduce inventory and bottle necks are not seen as a problem but as a handle to synchronise the flow. Everything else within the organisation has to be subordinated to the bottle necks, the goods given free, the use of non-bottle necks and the accounting system. As not only capacity resources but also other sources, like the market demand, can be the source which limit the flow, in the book the word *bottle neck* is replaced by *constraint*.⁴⁷

The theory elaborated upon leads to an iterative process:

- | | |
|--------|---|
| step 1 | identify the system's constraint(s) |
| step 2 | decide how to exploit the system's constraint(s) |
| step 3 | subordinate everything else to the above decision |
| step 4 | elevate the system's constraint(s) |
| step 5 | if in the previous steps a constraint has been broken, go back to step 1, but do not allow inertia to cause a system's constraint |

Applying the theory of constraints to the grain terminal, the five steps should be followed.

Step 1: identify the system's constraints

First step is the identification of the system's constraints. As presented above, constraints can be physical bottle necks, but also caused by other sources, like the organisation and cultural differences. All types of constraints, but the cultural ones, are dealt with in this paragraph. Paragraph 3.7 focuses on cultural differences as a constraint.

The system's constraints can be identified by making a capacity resource profile, or by observation and analysis of the cargo flows and delays during the production process.⁴⁸ The easiest way to spot a bottle neck is walking the floor and looking for piles of inventory. The grain terminal's process is not an ordinary, continue production process: interruption of the goods flow causes a interruption in the supply. Therefore, inventory can not pile up and the inventory-spotting method can not work in this environment. Insight in the cargo flow and delays are needed to get insight in the process. An overview of the cargo flow will show the position of the capacities resources and their connections, while the delay analysis gives insight in the process: a capacity resource can become a constraint because of the number and time span of break downs, which decrease the availability.

By analysis of the cargo flow insight in the process will be obtained. Systematic handling analysis, an organised, systematical and logical method, developed by Muther and Hagenäs, is used as basis for the

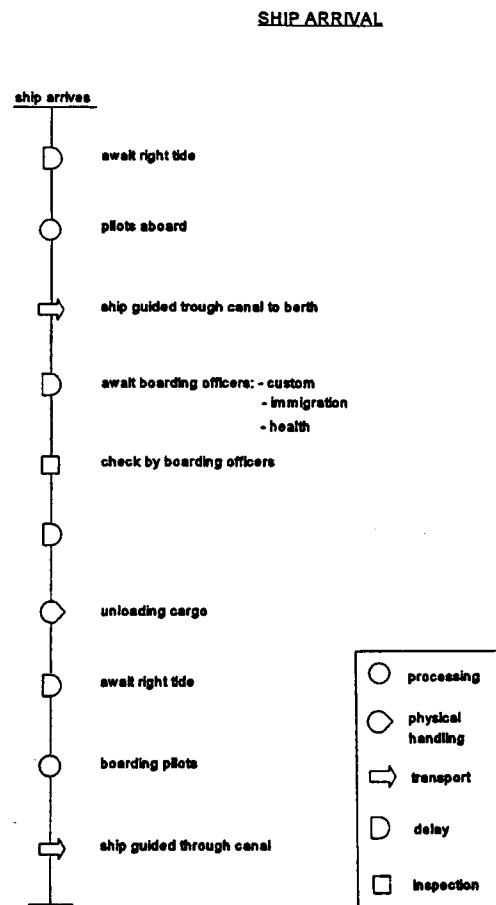
⁴⁷ Cox, J., Goldratt, E.M., *The Goal; supplement*, (Worcester: Gower, 1989, p. 299).

⁴⁸ Vollum, R., *Managing constraints for optimum factory synchronization* (Falls Church: The American Production and Inventory Control Society (APICS), 1988).

analysis of the materials' moves.⁴⁹ The method was developed to design lay outs of production organisations, but here it is only used for analysis of the goods flow as the port's lay out and the one of the terminal are already laid down. After definition of the goods, the goods flow is summarised in a scheme.

The products made by the grain terminal are discharging of dry bulk, storage of dry bulk and bagging of dry bulk. The payment for this product is done per metric ton. A penalty and reward system also influences the generation of money: when the discharging takes more than a certain time, the stevedoor is demurraged by the charter price of the delay. If the ship is handled within this time period, the stevedoor is payed a reward of half the charter price of the time won on the planning. Delays caused by the ship and the wheather are not taken into account in the system's time calculation, neither are all procedures before the unloading starts and after finishing discharging. It is clear that for the generation of money, not only the quantity of cargo discharged but also the pace of discharging is very important. It is important to minimise the discharging time. Only one type of cargo, dry bulk, existing of fertiliser, sugar and grain, is transhipped by the grain terminal. The quantity transhipped varies per load between 10 and 20,000 tons. The place of discharging is a quay and storage finds place 500 meter from the quay side. The terminal's production is not continu, as only once in a while a ship has to be discharged. But once the ship arrives, the discharging has to happen as quickly as possible, so the goods flow has to be optimised. The lay out of the terminal is laid down, as are the modes of transport and other equipment. The descriptions given in paragraph 3.3 are basis for the schematic cargo flows in figure 3.2. Although ship arrival and handling do not belong to the grain terminal's responsibility, these procedures are given schematically as well, as they affect the ship's turnaround time.

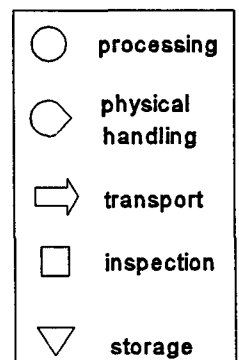
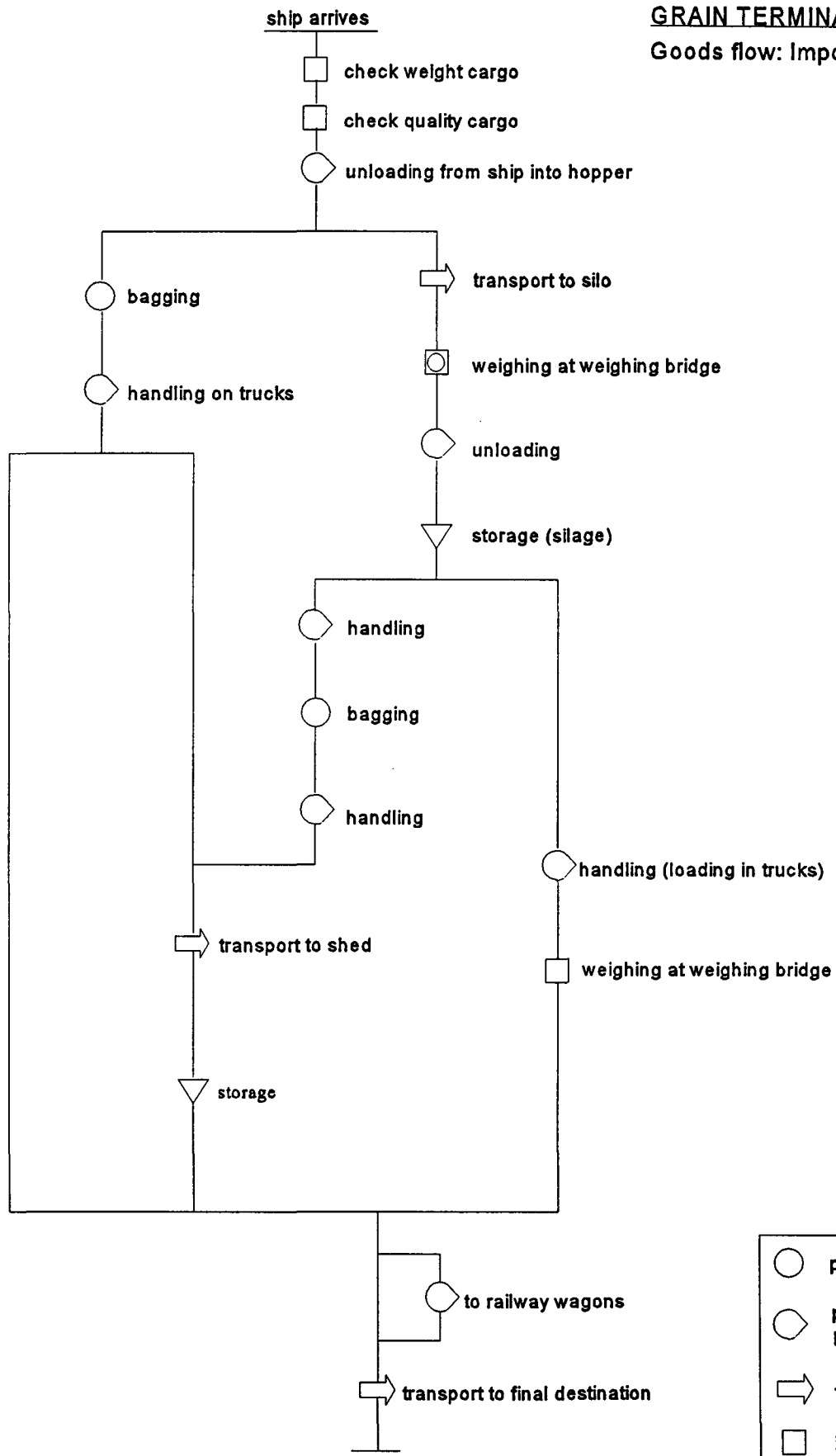
Figure 3.2



⁴⁹ Muther, R., Haganäs, K. *Systematische Materiaalstroom en Transport Analyse (SHA)* (Zoetermeer: Algemene Verladere en Eigen Vervoer Organisatie, 1979).

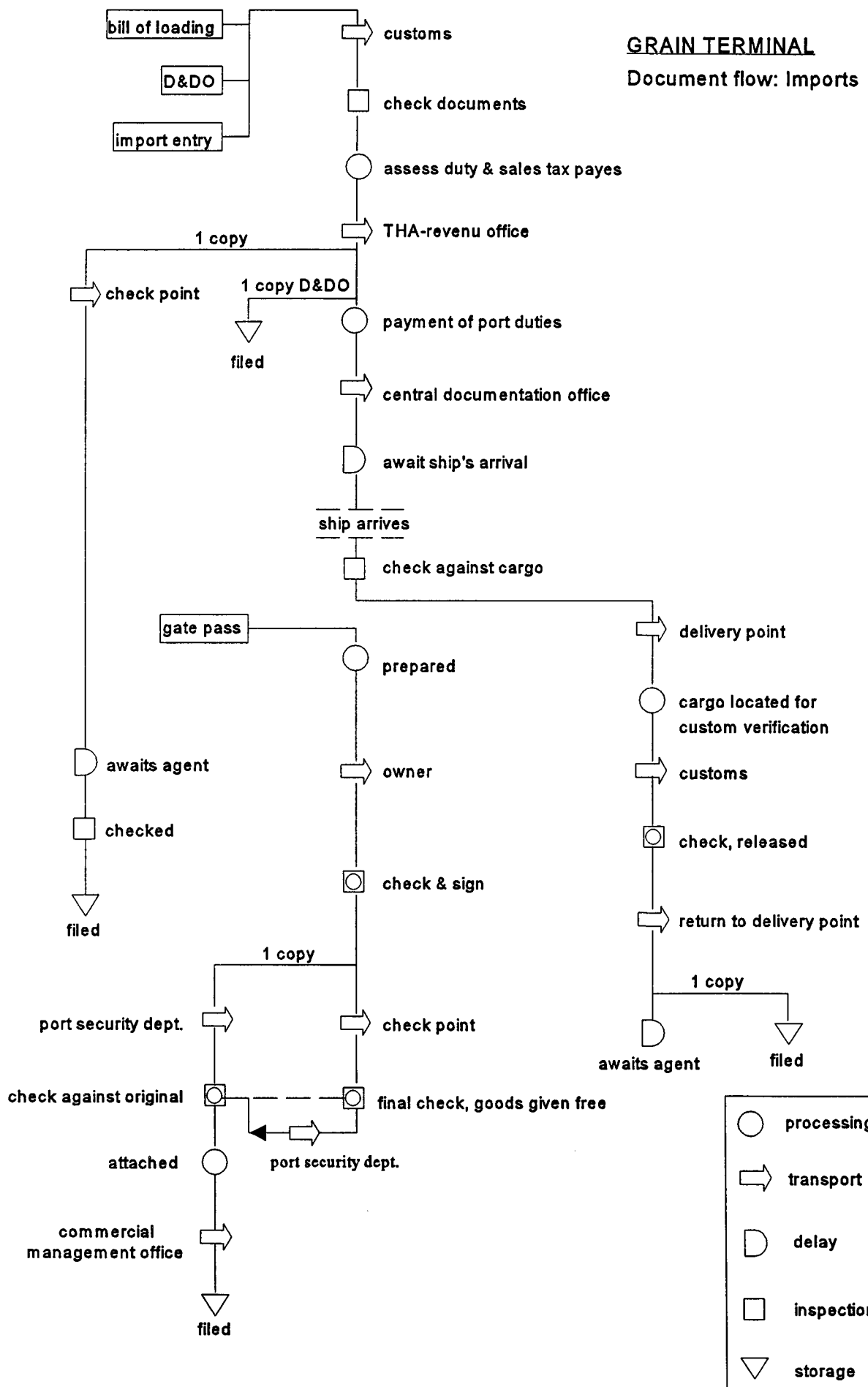
GRAIN TERMINAL

Goods flow: Imports



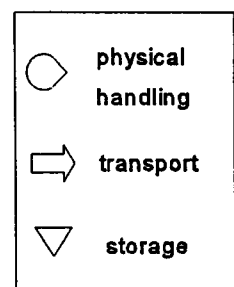
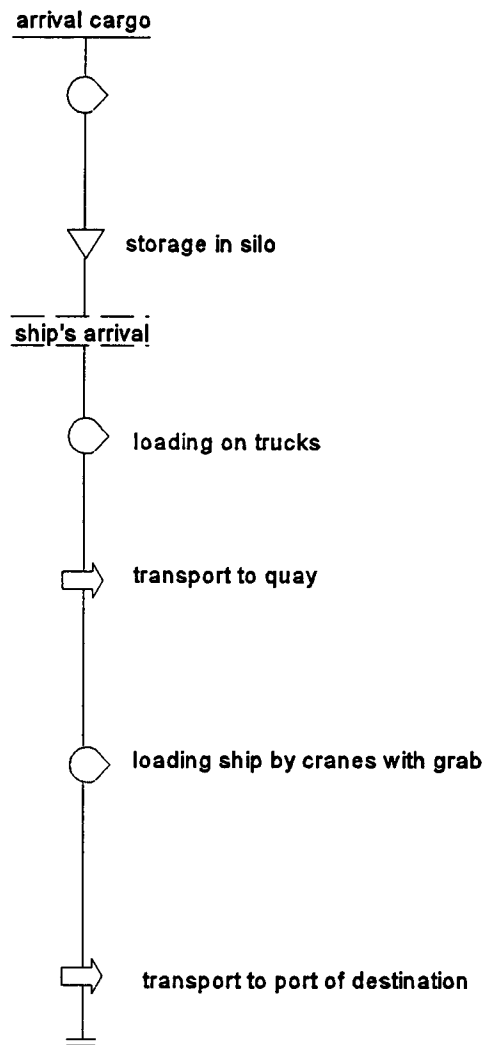
GRAIN TERMINAL

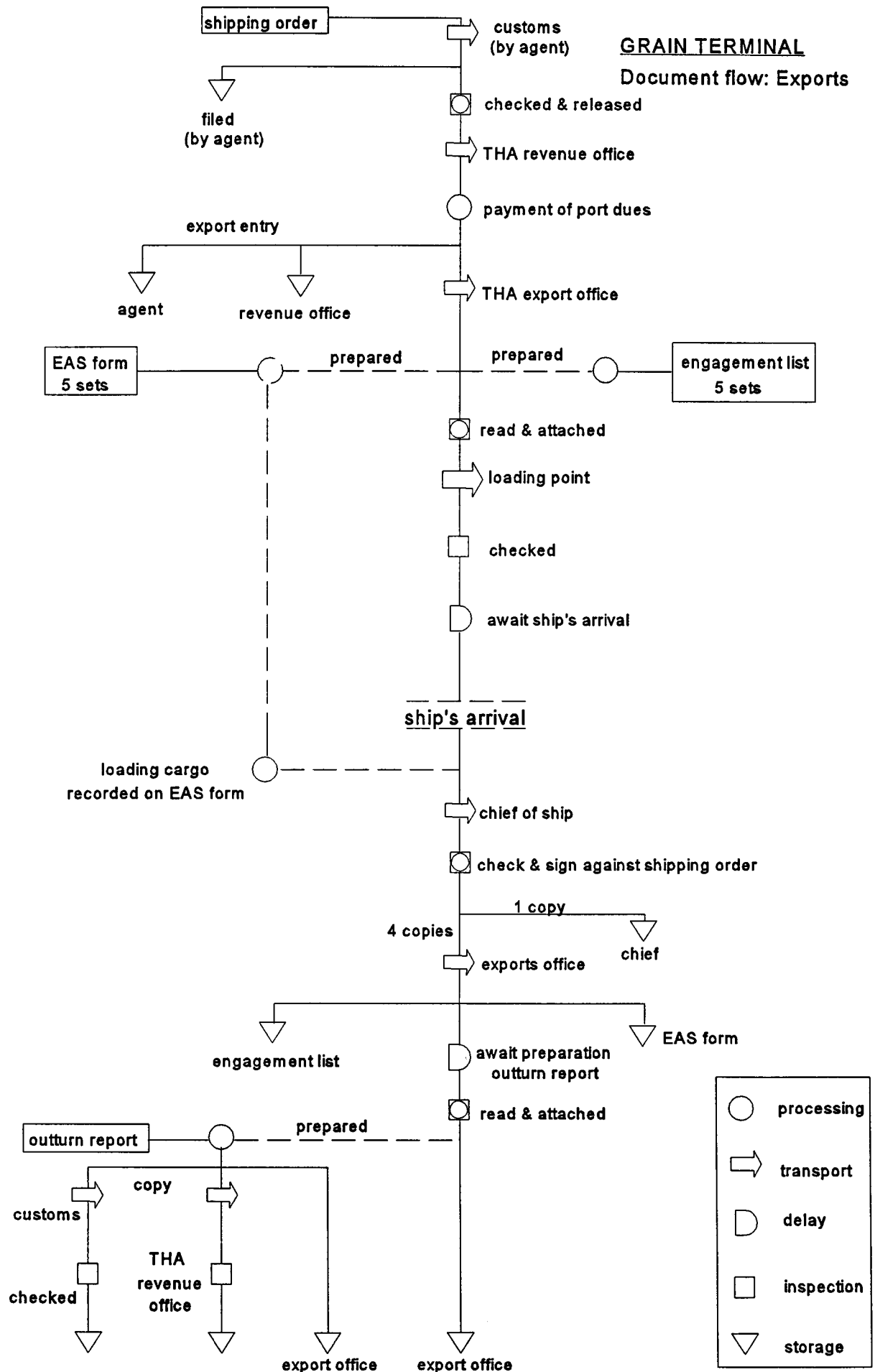
Document flow: Imports



GRAIN TERMINAL

Goods flow: Exports





At the basis of the delay analysis of the grain terminal logistics are nine Statements of Facts of two ships which called the port in November 1994 and seven ships which called the port in 1995. The seven ships which called the port in 1995 represented 42% of the total free flowing commodity imports in that year, in which a total of 20 ships were involved. It was impossible to obtain the other Statements of Facts. The nine documents are used for a delay analysis. Analysing the documents gave some problems as not all documents were very detailed and some parts were unreadable. Also the interpretation of the figures was not unambiguous as the effect of a delay on the whole discharging traject is not always clearly noted on the documents. In case of a defect in one of the bagging plants, it is clear that one bagging line is out of order during the delay. Rain causes delays in all discharging activities, but the affect of a delay caused by transport is less unequivocal. Although there are no trailers available, the bagging can start or continue anyhow and the bags will be put on the trailer later on. Of course, this causes some delay in the process, but not in the bagging process. But when the discharged grain has to stay bulk, and the trucks are delayed, the whole discharging process is delayed. (For this reason truck drivers receive a premium for each time collecting grain at the quay side.) Delays caused by transport are interpreted as delays affecting only one line. A summary of the delays is shown in appendix C-3, as well as all delay times and their causes per ship. A summary of the causes of the delays is shown in sequence of importance in table 3.10.

Table 3.10

Causes and importance of delays			
Sequence	Cause delay	Delay (hrs)	Delay (%)
1	labour	104.5	26.6
2	rain	81.7	20.7
3	transport	81.3	20.6
4	power	46.0	11.7
5	operational	34.3	8.7
6	ship	20.9	5.3
7	crane	14.1	3.6
8	others	10.5	2.7
9	shunting	0.4	0.1
Totaal		393.7	100.0

Source: 9 Statements of Facts

The 400 hours of delay take 25% of the total berth time of the nine ships (for details see the appendix) and the categories labour, rain and transport account for two-third of the delay time. With regard to delays falling under 'labour' some remarks can be made. Allocation of the gangs causes part of the delays, but more important are the waiting times: the workers often arrive late so the gangs cannot start in time. From the Statements of Facts can be deduced that allocation of the gangs is possible in only 10 minutes and probably it can be done even faster. But in practice allocation takes often over 20 minutes, and together with the waiting time a shift of workers often takes 30 minutes to one hour. A very few times a gang did not show up at all and twice a delay was caused due to no crane driver showing up. To motivate gangs, a bonus is paid when a certain quantity is made during a shift. No charges are made for arriving late.

The delays caused by rain are unavoidable when using grab cranes for discharging, as the commodities should stay dry and the weather can not be influenced.

Most delays falling under 'transport' are caused by waiting time for trailers, according to the Statements of Facts no delays were caused by late trucks: the bonus paid to the truck drivers for each load is probably reason for that. A negative side effect of the premium system is that the drivers drive irresponsible. Once a delay was caused by a truck drivers strike, more money was their stake.

Power cuts happen only incidentally, but last quite long and influence the whole bagging process. The bagging plants, the cranes and the silo work on electricity. The bagging units have a back up generator and also the cranes have a back up. However, it takes some time before this is connected. The grain terminal cannot take any commodities in case of a power cut. Discharging contracts contain a clause in which is stated that the ship's cranes have to function, but still delays are caused by the cranes. Two more remarks have to be made: first, the capacity of the power stations in Dar es Salaam were expanded in the end of 1995. Since then, power cuts occurred only very incidentally and last shorter.⁵⁰ Second, the power cuts and the bad weather are nowadays closely connected.

Delays due to operational causes account for almost 10%. Break downs of one of the bagging machines and absence of bags are the reasons. (Break downs of the equipment can only partly be prevented by in time-maintenance. Better planning could help that all articles needed for bagging are in time at the place where they are needed.)

All delays caused by the ship are on account of the ship and THA nor Nectar can exert any influence on these delays.

Maintenance and repair of the equipment is for Nectar's account, including the grabs. Break downs of the crane and the grabs happen occasionally.

Delays caused by other reasons are due to late officers and Ramadan.

Shunting does not need any explanation.

Identification of the constraints

Within the system, two constraints are found outside the discharging process. The first is the demand for discharging services: checking the arrival data of ships, it becomes clear that only a very small part of all potential production time is used for production. The second constraint is the entrance: by lack of sufficient depth and wideness of the entrance channel, ships cannot enter the port as soon as they arrive. The regulation that ships can only enter the port by day light also contributes towards congestion.

Within the discharging process constraints are found as well. According to the theory, operational constraints can be traced by the quantity of work waiting before the capacity resource.

The ship is discharged by cranes. The cranes dump the commodity into large hoppers, which end into either the bagging plant or the trucks. So when the cranes cannot function, the whole discharging system cannot work. Even when by contract it is arranged that the ship's cranes have to be operational, a failure of the shore cranes cause delay, as the time to bring the ship's crane into operation is lost. The cranes have a back up in case of power cuts. As becomes clear from the Statements of Facts, in practice, failure of the cranes only incidentally happens, but most often take quite a long time span. Sometimes a bagging plant has to be moved to another crane, which also causes delay. For this reason it can be concluded that the shore cranes are a bottle neck.

When the grain has to be bagged, the hoppers deliver the cargo to the bagging plants. In case of one of the bagging plants being out of order, the whole discharging process following this hopper is constipated for the time of the delay. Observations made clear that disruptions within bagging plants occurred regularly. This is confirmed by the delay analysis. The discharging routes cannot work faster, because of this delay, so it becomes clear that also the bagging plants are a bottle neck. The bags

⁵⁰ Information given by Nectar representative.

produced by the plants are put onto trailers by manpower. In case of no trailer available, the bags can be stored temporarily at the quayside and transferred as soon as the trailer arrives. This will cost more man hours than planned, but it will not affect the pace of bagging, nor the pace of discharging. For this reason this transfer to trailers and the trailers themselves are non-bottle neck resources, but the extra manpower needed works against the goal of generating money. This applies also for the storage of the trailers in sheds. The last stage in the system, the transfer from the sheds to the final destination is a bottle neck neither, as the pace of delivery does not directly influence the goal of the work done: generating money. As stated before, congestion is never good for a port.

The cargo with the silo as temporary destination, is dumped from hoppers into trucks. The truck capacity might be a bottle neck, but in practice is not. Most often of all ten trucks which are available, only five are used for the cargo transfer from ship to silo. In case of power cuts, the silo can not take in commodity and for that reason the discharging will be delayed. In fact, power service is a constraint. The truck drivers receive a bonus per load transported, which makes them eager to hurry. If the cargo is bagged after silage, this bagging is a bottle neck neither, as the pace of delivery does not influence the goal of the work done. Storage of the bulk cargo is not a bottle neck, as the silo is large enough. Storage even works in favour of the goal as long as the tariffs for storage are charged. Unfortunately, in practice those tariffs are not charged.

Summarised, the constraints are the *market demand* for discharging services by the grain terminal and the *port's entrance channel* and within the discharging process, the *power service*, *cranes* and *bagging plants*.

Step 2: decide how the constraints are exploited

After recognising the the system's constraints, the second step in the process is to decide how the constraints are exploited. With regard to the demand, the marketing activities have to be revised. It might be possible to attract in more ships with free flowing commodities. Another possibility is to start export of dry bulk as well and even start bagging before loading the ship.

Currently ships can only enter the port at the right tide and during day light. To optimise this constraint, the 'opening times' of the channel should be made as long as possible. Of course, the tide cannot be influenced, nor the day light. But the pilots can board the ship from just before sun rise untill dawn. Working times have to be expanded when ships are expected to arrive.

The power service is a constraint which falls outside the grain terminal's area of influence, for this reason nothing useful can be said about optimising this constraint.

With regard to the operational bottle necks, it is important to optimise the use of the bottle necks. Exodus at the bottle necks has to be avoided, as has all unnecessary work at the bottle necks. For the cranes no reduction of the work is possible, but some work performed by the bagging plants during discharging might be shifted in time. As most, if not all, bags are stored in sheds for a period, the bagging could be done partially from the silo as well. In this stage bagging is not a bottle neck anymore. Shifting part of the bagging activities is only possible by using (part of) the overcapacity of the trucks. It might even be better to use less bagging lines, so more hoppers can be used to dump the commodity in trucks. Calculation will easily prove whether this allegation is true.

Step 3: subordinate everything to the exploitation of the constraints

As it is very important to keep the system's bottle necks operating, attention is going first to the system's constraints. Per constraint measures have to be taken in the system, to ensure that each constraint is exploited maximally.

For marketing no particular instructions can be given, but with regard to the entrance channel, all procedures have to start as soon as the ship starts entering the port. All boarding officers have to be ready to enter the ship as soon as it is berthed and the discharging equipment and the gangs should be ready for action as well. Interesting time savings are possible when the all boarding officers, the customs, health and immigration officers, board the ship together with the pilots.

Power service does not belong to the terminal's or even THA's responsibility, so taking measures is not an option. The effect of power cuts can be minimised by generators which are kept ready during the discharging process.

In the operating system everything has to be organised to avoid disturbances in the operation of the bottle necks. Trimming gangs have to make sure the cranes can grab the grain uninterrupted, and bags, yarn to stitch the bags and other requirements have to be available in all bagging plants all the time. As explained above, the only place where inventory is allowed and even is planned, is before the bottle necks. Workers should be in time, so the time span taken by shifting of gangs is minimised and breaks can not be allowed at the system. It is better to fill up the breaks by other workers than just stopping the bagging activities. Failure of the shore cranes should be absorbed by keeping the ship's cranes prepared for action. Preventive maintenance of the bagging plants and the grabs between the ship calls is also very important. Investments in the preventive maintenance of the bottle necks will easily earn themselves back, as an hour lost at a bottle neck is an hour lost at the whole system.

Step 4: elevate the system's constraints

To optimise the bagging system, the constraints have to be elevated. Methods to upgrade the constraints are discussed below per constraint.

Elevation of the marketing system is not easily to reach. The marketing for the grain terminal is contracted to Nectar and executed by the headquarters in Great Britain. This department should try to find more work for the terminal in Dar es Salaam.

The capacity of the entrance channel can only be elevated by large investments in equipment to make it possible for the pilots to work at night time as well and in infrastructure (deepening and widening of the channel). When the pilots are able to work in nightshifts as well, interesting savings might be possible, but all other officers should be available for work as well. Waiting time can be reduced this way. Also when the night shifts can not be implemented, boarding together with the pilots or even as soon as the ship arrives at the port, the officers can enter the ship. So after berthing the discharging can start immediately.

Increasing the capacity of the operational system is less expensive. By bringing the ship's cranes into action parallel, the crane capacity can be increased, though it is not sure whether this option is useful. Keeping the ship's cranes as standby capacity, in case of failure or power cut, is useful. Setting another hopper might be a possibility to increase the discharging capacity, as more trucks can be delivered.

Purchasing another bagging plant would be the only possibility to increase the bagging capacity.

As the goal of the port enterprise is generating money as much as possible, it is clear that the cheapest options should be executed first. Only when the constraint still lacks capacity, more expensive measures can be taken. Some of the recommendations, the most expensive ones, will influence the whole port, and not only the grain terminal. Decisions regarding these constraints can be considered by the THA-management.

Step 5: if in the previous steps a constraint has been broken, go back to step 1, but do not allow inertia to cause a system's constraint

It must be mentioned that the process has to be repeated endlessly, as it is iterative. Because the proposed changes are not executed, the process is only passed through once. An increase in throughput might possibly create new bottle necks, but most enterprises have so much extra capacity that it takes an enormous increase in throughput before this happens. It is not likely that streamlining the discharging flow creates a new bottle neck in this stage. The measures mentioned above to elevate the capacity resource of the entrance channel will solve this constraint, but the operational bottle necks might still stay bottle necks. New bottle necks can originate when bulk throughput in the terminal increases. If the bagging after silage also becomes a constraint, the silo's bagging plant should be made operational. It is a waste of money not to use this plant and this also increases the throughput of the silo.

By situating two trailers near the bagging plants, no lack of trailers can come into being. This measure avoids superfluous lugging with the bags and it must be possible to arrange, as the trailers are in the port anyway, otherwise they should not be available later on in the process.

Additional remarks

With regard to THA's policy some remarks can be made. Optimising the use of bottle necks and elevation of the constraints has first concern, but streamlining the other parts of the discharging process also is important. This benefits the port in the form of a smooth flow of cargo. Congestion in a port causes problems as the working space in sheds and open storage areas becomes limited. Organising a smooth cargo flow might prevent the storage areas becoming a bottle neck and is attractive for importers as well. For this reason, THA should co-operate with both railway companies. Joint investments in the transport system could be a possibility, so an overall package can be offered to clients. This might enlarge THA's over all market share in East Africa, not only of the grain terminal. Streamlining all procedures regarding the incoming ships before discharging can start, also shortens the turn-round time of the ships. Each reduction effects the turn-round time directly.

Investments in the widening and deepening of the entrance channel are necessary to develop the port in Dar es Salaam and to keep pace with the competitors. The entrance channel is a bottle neck. Deepening of the berths is also unavoidable in the long run.

A change in mentality of workers and employees should be managed into a more responsible one. It is important that changes in mentality find place on all levels. Everyone has to become cost conscious and, more important, everyone has to work in the direction of the goal. A premium system combined with education at all levels might work. Not charging customers for silage works against the goal by lacking income. So it is important to send bills to the customers and make sure they are paid.

3.7 CULTURE AND CHANGING SITUATIONS

In the previous paragraphs the bottle necks in the cargo throughput of the THA-grain terminal were identified and ways and means to deal with these bottle necks were recommended. What is not yet touched upon is how changes in the system and procedures have to be managed in the light of the differences in cultural background between the main actors involved. For the ultimate success of proposed changes, this is certainly a valid point: Hofstede's national cultural and organisational dimensions and indexes are used to get some insight in this matter.⁵¹ A summary of Hofstede's theories and indices is presented in appendix C-4.

Hofstede calculated various indicators for various countries and these are important in the light of the cultural differences between the actors involved in the THA grain terminal. The first actor country is Tanzania, since THA's management and the grain terminal's management is Tanzanian. The second actor country is Great Britain, since Nectar is British owned. The third actor country is the Netherlands, since Nectar's general management in Dar es Salaam is Dutch. For these three actor countries Hofstede has calculated four indexes: power distance index (PDI), individualism index (IDV), masculinity index (MAS) and uncertainty avoidance index (UAI). In table 3.11 the scores of the indexes are divided into three groups: low, middle and high. As the score on PDI varies between 11 and 104, the low category includes all scores from 11 to 42. The middle and high score include 43 to 73 and 74 to 104 respectively. The categorisation for the other indexes is done in the same way.

Table 3.11

Scores of Tanzania, Great Britain and the Netherlands on the four dimensions of culture			
	Tanzania	the Netherlands	Great Britain
PDI	middle	low	low
IDV	low	high	high
MAS	middle	low	high
UAI	middle	middle	low

Source: Hofstede, G., *Cultures and organisations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.26, 55, 84, 113).

For the functioning of organisations the PDI and UAI scores are of particular importance since they relate directly to management structure and management attitudes and since the differences between the actors in scores are significant.

Now looking again at the key differences between the actors, see appendix C-4, tables 1 and 4, the following is found. With respect to PDI, the Dutch manager, from here indicated as Nectar-GM, and the enterprise Nectar have the following in common (see table 3.12).

⁵¹ Hofstede, G., *Culture's consequences; international differences in work-related values* (London/Beverly Hills: Sage publications, 1980); Hofstede, G., *Cultures and organisations; software of the mind*, Institute for research on intercultural cooperation (IRIC) (London: McGraw-Hill Book Company, 1991).

Table 3.12

Key differences between Nectar-GM & Nectar and THA-grain terminal general norm and workplace (PDI)	
Nectar-GM & Nectar (both scored low)	THA-grain terminal (middle)
1. inequalities among people should be minimized	1. inequalities among people are both expected and desired
2. there should be, and there is to some extent, interdependence between less and more powerful people	2. less powerful people should be dependent on the powerful; in practice, less powerful people are polarized between dependence and counterdependence
3. more educated persons hold less authoritarian values than less educated persons	3. both more and less educated persons show almost equally authoritarian values
4. hierarchy in organisations means an inequality of roles, established for convenience	4. hierarchy in organisations reflects the existential inequality between higher-ups and lower-downs
5. decentralisation is popular	5. centralisation is popular
6. narrow salary range between top and bottom of organisation	6. wide salary range between top and bottom of organisation
7. subordinates expect to be consulted	7. subordinates expect to be told what to do
8. the ideal boss is a resourceful democrat	8. the ideal boss is a benevolent autocrat or good father
9. privileges and status symbols are frowned upon	9. privileges and status symbols for managers are both expected and popular

Source: Hofstede, G., *Cultures and organizations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.37).

The Nectar representative and the THA-grain terminal have the following in common with respect to their attitude to uncertainty avoidance (see table 3.13):

Table 3.13

Key differences between THA-grain terminal & Nectar-GM and Nectar general norm and workplace (UAI)	
Nectar (weak uncertainty avoidance)	THA-grain terminal & Nectar-GM (middle risk avoidance)
1. uncertainty is a normal feature of life and each day is accepted as it comes	1. the uncertainty inherent in life is felt as a continuous threat which must be fought
2. low stress; subjective feeling of well-being	2. high stress; subjective feeling of anxiety
3. aggression and emotions should not be shown	3. aggression and emotions may at proper times and places be ventilated
4. comfortable in ambiguous situations and with unfamiliar risks	4. acceptance of familiar risks; fear of ambiguous situations and of unfamiliar risks
5. what is different, is curious	5. what is different, is dangerous
6. there should not be more rules than is strictly necessary	6. emotional need for rules, even if these will never work
7. time is a framework for orientation	7. time is money
8. comfortable feeling when lazy; hard-working only when needed	8. emotional need to be busy; inner urge to work hard
9. precision and punctuality have to be learned	9. precision and punctuality come naturally
10. tolerance of deviant and innovative ideas and behavior	10. suppression of deviant ideas and behavior; resistance to innovation
11. motivation by achievement and esteem or belongingness	11. motivation by security and esteem or belongingness

Source: Hofstede, G., *Cultures and organizations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.125).

With regard to the differences in power distance, advice is given how to deal with the culture differences deduced from Hofstede's findings. At each point, the preferred situation and the current situation (perceived by observations) are described.

1. In Tanzania, inequalities among people are both expected and desired, so it would be unwise to minimise the inequality. The Nectar GM has to realise this perception of inequality. In practice, the Nectar GM does know how to deal with this inequality.
2. The knowledge regarding the dependence of Tanzanian lower educated employees can not be translated in concrete instructions.
3. In Tanzania, both more and less educated persons show almost equal authoritarian values. This must be realised when dealing with higher placed people in the THA-organisation, like the grain terminal management. In practice, the Nectar GM does know how to deal with the authoritarian values of the Tanzanian management.
4. Hierarchy in organisations reflects the existing inequality between people, so the Nectar GM has to understand that he should not try to level out the distances between himself and his Tanzanian employees too much. In practice the Nectar GM does know how to deal with the authoritarian values of the Tanzanian management.
5. Although centralisation is popular in Tanzania, the grain terminal should not meet in this point. The grain terminal is too large and ponderous to be steered centrally. Also centralisation disagrees with THA's current policy of privatisation and decentralisation.
6. In Tanzania, a wide salary range between top and bottom of the organisation exists. This range is much smaller in the Netherlands and Great Britain, but it is not practical to introduce a narrow salary range. So, in Tanzania, the Tanzanian scale should be maintained. In practice, the Tanzanian range is respected.
7. The Tanzanian subordinates expect to be told what to do, so the Nectar management should reckon with the fact that no initiatives can be expected from the Tanzanian employees. Tasks to be performed have to be laid down clearly and imposed. In practice, the Nectar staff sometimes expects some initiative taken by the workers.
8. Although in Tanzanian eyes the ideal boss is a benevolent autocrat or good father, the Nectar GD should rather be a resourceful democrat. In practice, he is.
9. Privileges and status symbols for managers are both expected and popular in Tanzania, so the Nectar GM should fulfill the expectations. Observations made clear that the Nectar manager already enjoys some status symbols: he has a car with a driver, wears correct clothing and has both a mobile telephone and a walky talky. The other Nectar employees also enjoy some status symbols.

Also with regard to the differences in uncertainty avoidance, advice is given how to deal with the culture differences deduced from Hofstede's findings. At each point, the preferred situation and the current situation (perceived by observations) are described.

1. In Tanzania the uncertainty inherent in life is slightly felt as a continuous threat which must be fought. This knowledge can not be translated into a direct guideline for Nectar.
2. The stress felt by Tanzanian employees will give subjective feeling of anxiety. Again no direct guidelines can be made up from this knowledge.
3. Aggression and emotions may at proper times and places be ventilated. This knowledge again can not be translated into guidelines for Nectar.
4. The Tanzanians accept familiar risks but slightly fear ambiguous situations and unfamiliar risks. This means that Nectar should create a kind of certainty in its workplace. So the employees must be sure about their bosses expectations, that they belong to the fixed Nectar-crew or not, when they are expected to work, etc.
5. Tanzanians feel what is different as dangerous. This can be translated in the same advice as given in point 4.
6. The Tanzanian employees feel a slight need for rules. Translation to the workplace gives that it must be clear to the employees what is acceptable and what is not. So existing rules have to be

made clear and lived at consequently. From observation it seems that the felt need for rules is not realised by the Nectar GM. If it is, the rules are not used consequently.

7. According to Hofstede, Tanzanian people subscribe the statement that time is money. Observations do not agree with this point.⁵²
8. The supposed emotional need to be busy and inner urge to work hard, neither is observed among the Tanzanian employees.⁵⁰
9. The statement that precision and punctuality come naturally. Again, observations do not agree with this point.⁵⁰ But if Hofstede's assumption is true, it can be used by giving clear orders. The orders will be executed well. Nectar could use this knowledge, by making sure all orders given are perfectly understood by the employees.
10. Suppression of deviant ideas and behavior and a resistance to innovation is attributed to the Tanzanian employees. No concrete guidelines can be deduced from this statement.
11. According to Hofstede, the Tanzanians are motivated by security and esteem or belongingness. This can be used by Nectar by creating some security in the workplace. Creating a group feeling -we work for Nectar- may create the feeling of belongingness. This can be done by giving the employees little token which express the group. When Nectar had bagged 100,000 tons in total, t-shirts were given to their fixed employees. This is a good way to create the group feeling.

Summarising the guidelines deduced from Hofstede's research, Nectar has to realise that their Tanzanian subordinates expect to be told what to do and will not take many initiatives. But when orders are given clearly and in detail, the employees will fulfill their tasks well. For the employees feelings of security and belongingness are very important, this can be used by Nectar. The company should work with a fixed group of people and provide them with job security. Giving the people symbols of the group, like for example t-shirts, will help to create feeling of belongingness.

⁵² I suspect that Hofstede has mixed up his tables.

CHAPTER IV SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1 SUMMARY

Research questions

The following main research questions were formulated prior to the research:

1. *Through what form of joint venture can the THA-grain terminal best be privatised in view of the government aims?*
2. *How can the cargo throughput of the THA-grain terminal be improved?*

For both main research questions, relevant sub questions were formulated.

Methodology with respect to identification best joint venture form

The methodology with respect to the identification of the best joint venture included the following steps:

- Review of the policy of the Tanzanian government with respect to privatisation
Literature used to find the government policy regarding privatisation were two publications by the Parastatal Sector Reform Commission (PSRC): *Parastatal privatisation and reform: Masterplan and 1994 review and action plan for 1995 and beyond*. From these documents the government's aims with respect to privatisation became clear: improving the efficiency of all parastatal enterprises. The joint venture to be designed had to meet those aims as well as possible. Six main divestiture methods are known by the government, of which one is a joint venture.
- Review of the policy of the Tanzanian government with respect to the privatisation of THA
The government policies regarding privatisation of THA are briefly described in the PSRC publications mentioned: in the long term THA has to be privatised, but step by step. Conclusion of a performance contract is a step in the direction of commercialising and privatising. PSRC decided that the THA-grain terminal is the first part of THA to be privatised and a joint venture was chosen as divestiture method.
Within THA no policy regarding privatisation exists, the THA-management was waiting for the outcome of the Commercialisation Study, performed by consultants of the World Bank. Their report was not finished yet, but the facts and statements from the interim report were used. From other literature it became clear that, due to the economical characteristics of harbours, it is unwise to privatise seaports fully.
- Review of ways and means to create joint ventures
Through literature study, the characteristics of joint ventures were found and based on these the following definition was developed: a joint venture is an enterprise run by at least two companies which stay independent economically as well as juridically, and which have a shared interest in the business. From literature, seven types of joint ventures were distinguished. Those were put in a table with their characteristics and application specification. Only one type, the production and manufacturing joint venture, is applicable to the THA-grain terminal.
- Review of relevant aspects focused on the privatisation of the THA-grain terminal
Within THA, the grain terminal is to be privatised first, by means of a joint venture. THA's aims with respect to the grain terminal joint venture were studied, and all laws and regulations with regard to joint ventures, as well as the financial and labour aspects. Information published by THA, the Investment Promotion Centre and Ministry of Justice were used. The aims of all organisations

involved in the privatisation and all information found regarding joint ventures were put in a table and the current division of responsibilities between THA-terminal management and the private stevedoor Nectar, which will become the joint venture partner, were mapped. Analysis of those facts was the following step.

Methodology with respect to improvement cargo throughput THA-grain terminal

The methodology with respect to the improvement of the cargo throughput of the THA-grain terminal included the following steps:

- **General comparison of Dar es Salaam and Rotterdam ports**
From both ports important information was collected with regard to the traffic, economic importance, organisational structure, functional features, trends and future expectations.
- **Comparison of Dar es Salaam and Rotterdam ports focusing on dry bulk commodities**
The goods flow of the dry bulk was described for both the port of Rotterdam and Dar es Salaam. Ship arrival procedures, discharging, bagging and transport were described in detail, as well as all exports procedures. Also the belonging documentation was described.
- **Identification of useful harbour performance indicators and their application to Dar es Salaam and Rotterdam ports**
Congestion in ports is a serious problem, which should be tackled. The United Nations Conference on Trade and Development (UNCTAD) developed a set of port performance indicators, which reflect the situation of a port. The set consists of two parts: financial and operational indicators. For both ports the indicators were calculated and compared as far as possible.
- **Identification of a suitable method to improve the goods flows of THA-grain terminal**
To find a suitable method to analyse and improve the goods flow, four logistical theories applicable to the grain terminal's production process were studied: Material Requirements Planning (MRP-I), Just in Time (JiT), the Theory of Constraints (ToC) and the Method of Integral Steering (MIS). The ToC was chosen as the best method to improve the grain terminal's process.
- **Application of the suitable method (Theory of Constraints)**
The Theory of Constraints leads to an iterative, five step process, which was applied to the grain terminal only once. In the first step the system's constraints were identified and in the second step it was decided how those constraints are to be exploited. Next step was subordination of all other capacities to the exploitation of the other constraints. Then the elevation of the constraints was considered. Then it was checked whether a constraint had been broken.
- **Identification of possible cultural bottle necks in the THA-grain terminal organisation, using Hofstede's method**
Hofstede developed a method to measure a country's culture in four indexes: for all countries involved in the grain terminal management he calculated the indexes. Two of the indexes were particularly interesting for working situations: the Power Distance Index (PDI) and Uncertainty Avoidance Index (UAI). The conclusions Hofstede drew, because of the scores of Tanzania, were compared with observations. The outcome was used as a basis on which guidelines how to deal with the cultural differences were developed for the Nectar management.

4.2 CONCLUSIONS

Best joint venture form

The review of the general and specific (THA and THA-grain terminal) privatisation aims of the government of Tanzania and a scan of other relevant aspects with respect to privatisation through joint venture constructions, revealed the following aims and aspects (see table 4.1).

Table 4.1

Aims and conditions for new grain terminal joint venture	
Aims government	<ul style="list-style-type: none"> • improve operational efficiency • improve profitability • expand role of private sector • encourage wider participation by people in ownership and management • create more market oriented economy • to enhance access to <i>foreign</i> capital and technology • develop capital market • preserve self reliance • commercial enterprises become available for foreign and local investors
Aims THA	<ul style="list-style-type: none"> • long term contractual arrangement with private contractor • reasonable return on investment (what is reasonable?)
Aims THA-grain terminal	<ul style="list-style-type: none"> • temporary private participation in mgt GT, to achieve: <ul style="list-style-type: none"> increasing profitability improve efficiency maximise utilisation of facility
Aims IPC	<ul style="list-style-type: none"> • maximisation of foreign exchange earnings and savings • enhancement of import substitution activities which achieve identifiable substantial foreign exchange savings • expansion of food production • achievement of a high degree of technology transfer • creation of employment opportunities and the development of human resources • efficient utilisation, expansion and diversification of the productive capacity of existing enterprises • provision of services or production of goods which improve linkages between the various sectors of the economy • capital, technical skills and raw materials available to the applicant • local materials' supplies and services to be used by the applicant • interests and conditions of service of the labour employed or to be employed by the applicant • general promotion and development of enterprises within Tanzania and the need to generate constructive competition among enterprises • potential demand, both within the United Republic and elsewhere, for the product or services of the enterprises • siting or proposed siting of the enterprise in relation to the availability of power, fuel, labour, transport, raw materials, land and water • promotion of balanced and equitable growth throughout the country • interests of potential consumers from investment in the enterprise being undertaken
Laws and Regulations	<ul style="list-style-type: none"> • investments only allowed in certain areas; see also appendix B-2 • Certificate of Approval needed (granted by IPC, only when aims are met)

Aims and conditions for new grain terminal joint venture

Financial aspects

- | | |
|---|--|
| <ul style="list-style-type: none"> • foreign investments • foreign valuta • fiscal aspects | <ul style="list-style-type: none"> • any foreign investor is allowed to invest in new enterprises, except certain areas • no special legislation • newly found enterprises receive a 5 year tax holiday • after tax holiday, import duties on machinery and equipment required (for use only) 5% • tax on sales: 5% • no special taxes for foreign entrepreneurs |
|---|--|

Staff

- recruitment among *local* qualified citizens, unless impossible
-

It is obvious that the current agreement between THA and Nectar is not optimal to meet the goals set by THA as well as possible. The profitability is directly linked with efficiency and the use of the terminal. Improvement of the operational efficiency can only be reached when the people responsible for the performance are also responsible for all facets which could influence the performance. In the current contract, the responsibilities are mixed. Nectar is responsible for discharging and bagging, but not for all facets which influence the performance: e.g. labour, machines and equipment. Nor has the company final responsibility to its clients. The utilisation of the grain terminal can only be optimised by good marketing of the terminal. Another example of mixed responsibilities is the fact that Nectar is responsible for marketing of the terminal, i.e. attracting clients, but not for the management of the terminal's silo.

The THA-grain terminal joint venture should materialise in two steps, starting from the present, unsatisfactory, situation (see tables 4.2, 4.3 and 4.4).

Table 4.2

Current division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • final responsibility to THA-headquarter, Dar es Salaam-port management, general cargo terminal management and clients • space • silo ownership and management • machines and equipment • general labour 	<ul style="list-style-type: none"> • discharging • bagging • maintenance equipment • service equipment • procurement equipment • training in maintenance and service equipment • marketing

Table 4.3

Proposed interim division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • space • silo ownership • machines and equipment 	<ul style="list-style-type: none"> • final responsibility to THA-headquarter, Dar es Salaam-port management, general cargo terminal management and clients • silo-management • discharging • bagging • maintenance of equipment • service of equipment • procurement equipment • general labour • training future grain terminal management • marketing
	(• training in maintenance and servicing equipment)

Table 4.4

Proposed final division of responsibilities THA-grain terminal and Nectar	
THA-grain terminal	Nectar
<ul style="list-style-type: none"> • final responsibility to THA-head quarter, Dar es Salaam-port management and general cargo terminal management • space • silo ownership 	<ul style="list-style-type: none"> • final responsibility to clients • silo management • machines and equipment • discharging • bagging • maintenance of equipment • service of equipment • procurement equipment • general labour • marketing

Two of the government aims will not be met with the final division of responsibilities: the aim to encourage wider participation by people in ownership and the aim to develop the Tanzanian capital market. The first point can only be met by sale of shares, but because of the strategic importance of the port for the whole country, this is not a good option for the THA-grain terminal. Lack of private capital is another argument against this solution. As in Tanzania privatisation of banks has not started yet, it is impossible to develop a capital market.

Improvement of cargo throughput

Harbour performance indicators

Comparison of the ports of Rotterdam and Dar es Salaam made clear that differences are too large for a useful comparison. This is due to the differences in dimension - the port of Rotterdam is much larger than the port of Dar es Salaam -, the character of the port - in Rotterdam industrial activities around the port are stimulated, while Dar es Salaam is concentrated on transshipment only -, the economic situation of the hinterland - Rotterdam's hinterland is, economically, much larger than Dar es Salaam's hinterland -, the organisational structure - Rotterdam is a landlord port, Dar es Salaam is state owned. Not all UNCTAD port performance indicators could be found, and a comparison without very careful some considerations is of little use.

Theory of Constraints

To choose the best logistical theory to improve the cargo throughput, a comparison between four logistical production theories was made. The terminal's particular features were taken into consideration: the market demand is exactly known, as the raw material is delivered by the client. This implicates that no stocks have to be kept for unexpected market demand. Another feature is that no semi manufactured products are needed. Due to their culture, Tanzanian employees do not easily show initiatives and organisations are strongly layered. These arguments were taken into consideration when eliminating the logistical theories. The Theory of Constraints was the only one which survived the selection.

Operational constraints in the organisation of cargo throughput

Applying the iterative process to the grain terminal, the following constraints were found: the market demand, the port's entrance channel, the power service, cranes and bagging plants. It must be mentioned that the process has to be repeated endlessly, as it is iterative. Because the proposed changes are not executed, the process can only be passed through once, but it is not likely that streamlining the discharging flow creates a new constraint in this stage.

The Theory of Constraints provided good handle to identify the constraints and elevate them systematically. The method involves staff members, but in case of the THA-grain terminal the white Nectar people will probably be the only ones who come up with ideas. If the method is introduced seriously, the iterative process is repeated endlessly and so the management stays involved in improving the process.

Cultural constraints in the organisation of cargo throughput

With the help of Hofstede's method the following characteristics of the THA organisation were identified with reference to power distance: inequalities desired among people, authoritarian values on all levels, hierarchy in the organisation, centralisation preferred, wide salary range, subordinates expect to be told what to do, a boss should be a good father and privileges are both expected and desired. With regard to uncertainty avoidance, also differences were found: fear for ambiguous situations and unfamiliar risks, need for rules and motivation by security and esteem or belongingness. As we will see, the cultural bottle necks can conflict with the characteristics of the other actors.

Hofstede's method can only be used in combination with observations. Unthinkingly copying his findings would give serious errors: not all features for Tanzania were found during the observation period.

4.3 RECOMMENDATIONS

Best joint venture form

The best joint venture form for the THA-grain terminal, is the current co-operation, modified as indicated in the tables presented earlier.

Improvement of cargo throughput

In table 4.5 all logistical bottle necks are listed, with recommendations regarding their exploitation and elevation. As the iterative process is only gone through once, it is emphasized that the management should go through the process repeatedly.

Table 4.5

Logistical constraints and how to upgrade them		
Constraints	Exploitation	Elevation
<ul style="list-style-type: none"> market demand 	<ul style="list-style-type: none"> revise marketing ; try to attract more ships start export of dry bulk 	<ul style="list-style-type: none"> try to attract more ships
<ul style="list-style-type: none"> port's entrance channel 	<ul style="list-style-type: none"> optimise 'opening times' by expanding working times pilots and boarding officers ready to enter ship at berthing boarding officers enter ship with pilots discharging equipment and personell ready at berthing 	<ul style="list-style-type: none"> invest in equipment which makes it possible to pilot without daylight and adapt working times boarding officers invest in deepening and widening entrance channel
<ul style="list-style-type: none"> power service 	<ul style="list-style-type: none"> keep generators ready during discharging process 	<ul style="list-style-type: none"> --
<ul style="list-style-type: none"> cranes 	<ul style="list-style-type: none"> trimming gangs have to avoid exodus ship's cranes prepared for action preventive maintenance 	<ul style="list-style-type: none"> use ship's cranes increase no. of hoppers
<ul style="list-style-type: none"> bagging plants 	<ul style="list-style-type: none"> bags and stitching yarn have to be available workers have to be in time, no breaks for the plants shift part of the bagging activities to after storage preventive maintenance 	<ul style="list-style-type: none"> purchasing another bagging capacity

Depending on the expenses, not all elevations are realistic to execute. Some of the recommendations, the most expensive ones, will influence the whole port, and not only the grain terminal. Decisions regarding these constraints can be considered by the THA-management.

Solving cultural bottle necks

The cultural bottle necks found have to be dealt with by the Nectar management. The following recommendations could be of use: Nectar has to realise that their Tanzanian subordinates expect to be told what to do and will take few initiatives. But when orders are given clearly and detailed, the employees will fulfill their tasks well. For the employees feelings of security and belongingness are very important, this can be used by Nectar. The company should work with a fixed group of people and provide them with job security. A feeling of belongingness can be created by giving the people small token, like t-shirts.

Further research

Hofstede's theories are suitable for the identification of possible cultural constraints. It would be interesting to investigate how the theories can be operationalised into concrete advise for the grain terminal's managment.

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Appendices

To give some insight in the history of East African ports and the influence of the past in the present, part of the article *Inter-port competition in developing countries: an East African case study* is published integrally taken over below.¹ The figures can be found at the end of the article.

Historical perspectives

The chronological development of port activity on the East African coast may be divided into two periods of very unequal length, the first stretching from the first millennium AD to the mid-19th century and the second from the later 19th century to the present day. Both periods illustrate the processes of inter-port competition and port concentration, but in different ways. The coastal zone of Kenya and Tanzania (figure 1) now constitutes the maritime facade of a developing region of considerable economic potential, and forms a vital outward-looking link with the rest of the world. This orientation is, in a sense, largely a product of the last 200 years, for during all the long preceding centuries the coastlands were for trading purposes little more than part of the western shore of the Indian Ocean, dependent in commercial terms upon the seasonal reversal of winds bringing sailing vessels from the north-east between November and March, and facilitating their return from early April. Within this coastal environment successive generations built up widely differing hierarchies of seaports, which comprised important if rather peripheral elements within the widespread network of trading towns and ports stretching in medieval times from eastern Africa through south-western Asia to China.

The earliest surviving description of the external trade relations of East Africa is to be found in the *Periplus of the Erythraean Sea* (Huntingford, 1976), a guide to the commerce of the Red Sea and the Indian Ocean written at some time in the first or second century AD by a Greek trader living in Alexandria. The book describes a voyage along the East African coast and mentions, *inter alia*, the trading port of Rhapta which was subsequently described as a 'metropolis' in Ptolemy's *Geographia* (Stevenson, 1932). The site of Rhapta, which seems to have been East Africa's first focus of port concentration, has never been satisfactorily identified, although it has commonly been associated with the Rufiji delta in Tanzania.

In early medieval times port activity was quite widely dispersed along the Kenya coast, and several locations -including Pate, Manda, Lamu, Malindi and Mombasa- were seaports of significance, whereas Kilwa was the only major commercial centre on the coast of Tanzania. In a context of inter-port competition, each of these ports probably dominated in turn varying areas of coast and hinterland, their fluctuating comparative importance reflecting their varying fortunes in trade and in warfare. Most trading centres were based on defensive islands which conferred a clear advantage. Mombasa Island is known to have been settled as a maritime trading post in the 11th century, and it began to take shape as a town with the Shirazi migrations (from southern Arabia and southern Persia) in the 13th century.

The late Middle Ages were marked by a much fuller development of Islamic civilization, with rapid urban expansion and trade development especially in the 14th century, possibly associated with improved environmental and political conditions. The full development of Arab settlements and their trade and culture on the East African coast in the 15th century, dominated by Mombasa, immediately preceded a period of decline. At the end of that century, and from the south, 'the restless energy of western Europe intruded upon the East African coast like an unseasonable monsoon for which the inhabitants were totally unprepared' (ingham, 1962, p.6). The Portuguese programme of African coastal exploration culminated in the celebrated voyage of Vasco de Gama to India in 1497-99. He was impressed by the port and town of Mombasa, but received a warmer welcome at Malindi, where he erected a *padrão* or stone cross and found a pilot to guide him across to Calicut.

In spite of competition from a variety of other ports along the East African coast, Mombasa had clearly emerged by the 16th century as a centre of sustained port dominance, as no other port along this coast possessed its combination of positive situation and site factors. Soon the 13th century Shirazi town, on the eastern side of the island facing the Old Mombasa Harbour, was paralleled and eventually superseded by the Portuguese town of the 16th and 17th centuries. Which today provides the essential framework of the traditional urban core. The overall effect of Portuguese intervention on the East African coast was, however, negative; Mombasa maintained an attitude of open revolt against their authority from the time of Da Gama's first arrival in 1497 until their final withdrawal to the south early in the 18th century. The impressive Fort Jesus now stands as the only substantial physical monument to Portuguese rule (Kirkman, 1964), and as a mark of Mombasa's long-continued importance as a maritime trade centre and as a port city of significance.

Whereas the 18th century was a period of rather low-level, dispersed port activity on the East African coast, the 19th century brought significant changes. The rising tide of Arab-controlled slave trading severely disrupted the economic and social fabric of the hinterlands, and the offshore island of Zanzibar (selected by the Omani Arabs as a regional emporium, and today part of Tanzania) became the chief centre of trade and innovation. The re-entry of Europeans on the East African scene in the later 19th century coincided with important technological changes: the opening of the Suez Canal (1869), the change from sail to steam as a means of propulsion of vessels, the rapidly increasing size of ships, and the growing importance of railways. A combined result of these innovations was that in the early European colonial period arterial railways were built from port sites (Mombasa, Tanga and Dar es Salaam) selected for their ability to accommodate larger steamers in a context of increasing trade with Europe via Suez, and for their relationships with potentially productive hinterlands (Hill, 1949, 1957; Ramaer, 1978; Amin *et al*, 1986) (Figure 2).

In Kenya, Mombasa was the principal beneficiary in this process of port concentration whereby a traditionally fluid port pattern became crystallized as more capacious, sheltered, deep-water harbours replaced the minor inlets and open shorelines previously used by smaller vessels. In Tanzania, the German authorities selected Tanga and Dar es Salaam as the ocean termini of their railways to the interior. The intention to build railways, themselves powerful agents of innovation and economic transformation in the hinterlands, was the immediate cause of concentration of interest and activity on appropriate modern deep-water seaports. This process of rail construction from selected port sites took place in many colonial territories around the world, and not only effected a marked degree of port concentration but also set the scene for subsequent inter-port competition. Mombasa and Dar es Salaam were both particularly fortunate at this point in time, for their general geographical location and their specific site conditions enabled each to establish and maintain a central place in the modern economic life of the East African coastal zone.

The rise of the modern East African port system

The modern process of port concentration in East Africa effectively took place in the 1890s, when the beginnings of modern port development coincided with the start of railway construction to the hinterlands. The point of departure for the modern port of Mombasa was the purchase in 1895 of land near Kilindini Harbour as a base from which to direct the building of the railway through interior Kenya to Lake Victoria. Using Mombasa as an initial base, Britain had assumed political control of Kenya in 1895, and (as elsewhere) a standard procedure was to consolidate that control with an outline transport infrastructure, beginning with a railway to the interior from a selected port site. Mombasa was the obvious choice, as an established town, with a deep-water harbour of recognized potential. From these beginnings, the port of Mombasa has grown throughout the 20th century, starting with lighterage wharves at Mbaraki and proceeding upstream from 1926 to 1958 with deep-water general cargo berths along the north-western shore of the island. From the 1960s to the present day, additional deepwater berths and various forms of specialized quayage including a container terminal and oil-reception

facilities have been added on the mainland at Kipevu. There are long-term plans to extend these facilities, in the context of a maritime industrial development area, along the southern side of Port Reitz.

The degree of port concentration experienced in Tanzania during colonial and post-colonial times has been less marked. In German East Africa (1895-1919) it was originally intended to build three railways from different coastal ports: a northern line from Tanga towards Kilimanjaro; a central line from Dar es Salaam to Lake Tanganyika; and a southern line from Kilwa towards Lake Malawi. The third of these was never built, although the modern Tanzania-Zambia railway (completed in 1975) is in a sense its present-day equivalent; and there were also proposals to extend the central line towards Rwanda, and the northern line to Lake Victoria (Gillman, 1942). The intention was to create a more wide-spread diffusion of port activity, economic exploitation and political control, and to avoid the apparent over-concentration on Mombasa shown by the British in Kenya.

Tanga was the first of the modern seaports of the East African mainland to be developed, its primary role being to serve the agricultural economy of the northern part of the territory, initially based on coffee and rubber, later on sisal. A small jetty was built in 1892 to receive imported railway construction materials, and this marks the beginning of the modern process of port development on this site. The port has not, however, grown very substantially, for two main interrelated reasons: there are no deep-water facilities (other than a specialized fertilizer jetty); and the hinterland, although productive in cash-crop terms, is geographically limited. The Tanga-Arusha railway has not been extended to its proposed terminus at Musoma on Lake Victoria, despite political interest reiterated by Uganda. In a more prosperous economy than that of modern Tanzania, it is possible that Tanga might have been expanded as a deep-water port; the fact that it has not done so illustrates not only its own intrinsic weakness but also the overriding power of maritime factors in encouraging port concentration on larger centres, in this case the primary Tanzanian seaport of Dar es Salaam. Barge carriers would be an appropriate technical innovation at Tanga, as in some West African ports (Hilling, 1983), but these expensive vessels are not used in East Africa at present.

Dar es Salaam has actually captured most of Tanga's potential traffic after a link was opened in 1963 between the northern and central lines, from Korogwe to Ruvu (Hoyle, 1965; O'Connor, 1965). Previously much of this traffic was diverted to Mombasa along the Voi-Moshi feeder line completed in 1924, whose use has been marginal after the collapse of the East African Community in 1977 and the correlative break-up of the East African Railways Corporation as well as of the East African Harbours Corporation that ended regional cooperation in the field of transport. Both before and after these events, Tanga offers a good example of the 'shadow effect' arising from the opening of branch lines to major ports 'siphoning' the hinterland of a minor one. In the container era, this is an even more limiting factor to port growth; a comparable case is that of the new port of Taichung, 'sandwiched' between Keelung and Kaoshiung on Taiwan's west coast (Todd and Hsueh, 1990; Todd, 1993).

The Germans originally chose Bagamoyo, seaward terminus of the trans-Tanzanian Arab caravan trade route to Lake Tanganyika and beyond, as their chief port and seat of government. By 1891 it became obvious, however, that the sheltered harbour at Dar es Salaam, where a new Arab port and town had been founded in 1867, was more suitable. It was thus from Dar es Salaam that the construction of the central railway began in 1905, reaching Kigoma in 1914. During the pre-First World War years, the Germans established a port-hinterland system with clear objectives, a logical structure and considerable potential for further development. Moreover, the system was designed to serve not only German East Africa (which included Rwanda and Burundi, then known as Ruanda-Urundi) but also eastern Zaire (formerly Belgian Congo) and, ultimately, Zambia and Malawi (Hance and Van Dongen, 1958).

When, after the defeat of Germany, Tanganyika emerged as a League of Nations territory, the role of Dar es Salaam as a port serving extra-territorial areas was recognized by the incoming British administration. In 1921 sites at Dar es Salaam and Kigoma were leased to the Belgian Government to

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facilitate traffic flows to and from the then Belgian Congo. This link was further underscored when, in 1956, three deep-water berths were opened at Dar es Salaam, one of which was financed by the Belgian government; and a commission was established to facilitate traffic flows through the port to and from Zaire, Rwanda and Burundi. The growth of Dar es Salaam has been stimulated from the later 1960s onwards by increases in Zambian traffic, and additional deep-water berths were constructed in the 1970s with financial support from the Zambian government.

Two further elements in the diffusion of modern port activity on the Tanzanian coast remain. One is the port of Zanzibar, which continues to serve the economy of the offshore islands but no longer fulfils its 19th-century role as a regional emporium (Hoyle, 1983). The other is the deep-water port of Mtwara, in the far south of Tanzania, which was opened in 1954 (Brookfield, 1955) together with a short railway to serve an ill-conceived agricultural development scheme focussed upon groundnut production (Hogendorn and Scott, 1983). The scheme failed, the railway was removed in 1963, and the harbour and port facilities at Mtwara remain seriously underutilized. From time to time, as pressure on the primate Tanzanian port has increased, suggestions have been made that some traffic might be diverted to Mtwara or to Tanga. Shipping companies, however, and land transport organizations, have not generally supported this idea. Although modern port development in Tanzania is more diffuse than in Kenya, the degree of concentration on the primate port is in many ways just as strong.

- [1] Hoyle, B., Charlier, J., Inter-port competition in developing countries: an East African case study, *Journal of Transport Geography*, Volume 3, No.2, (Elsevier Science Ltd, 1995, p.89-95).

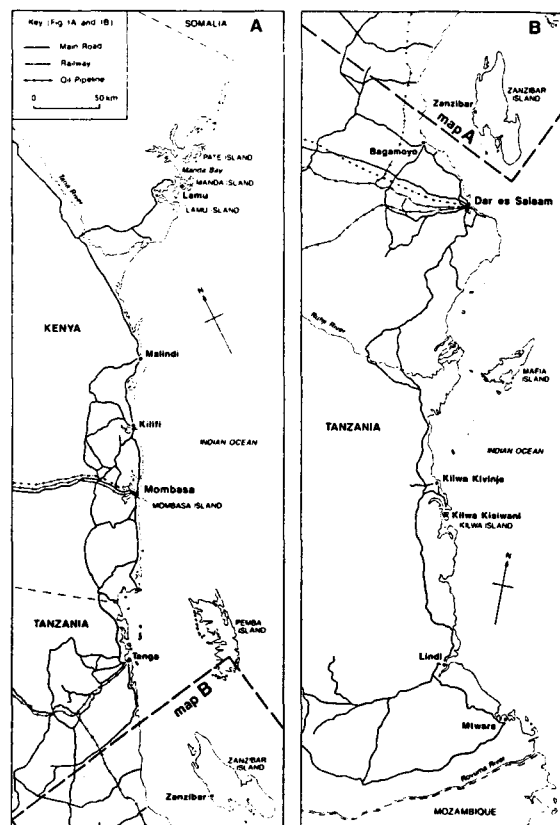


Figure 1 The coast of Kenya and Tanzania

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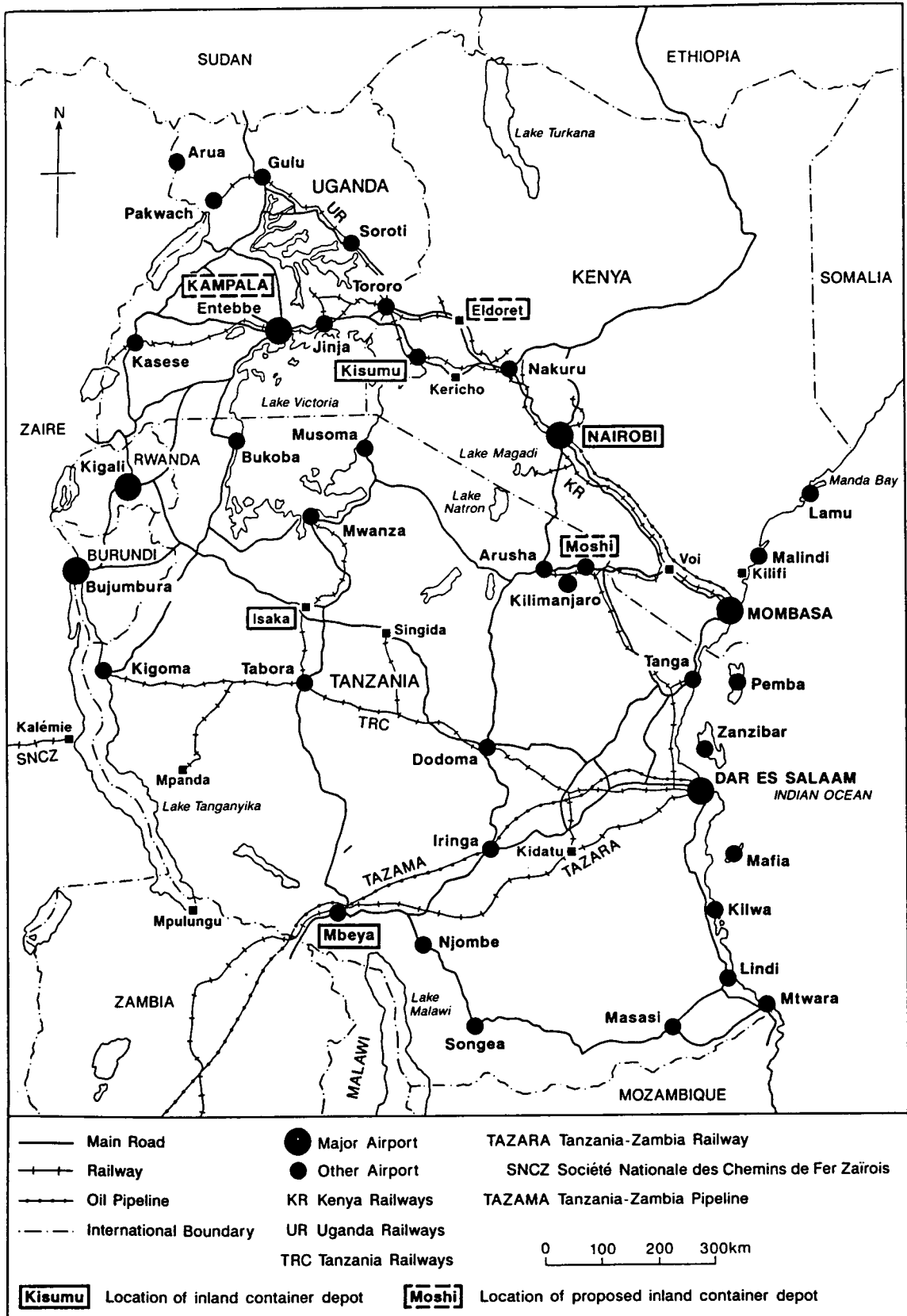


Figure 2 The East African transport system

Performance contracts - an outline

A performance contract is a formally signed document, negotiated and agreed between government and management. The contract includes clear specifications of the:

- enterprise's commercial objectives, and how non-commercial objectives, if any, will be financed
- performance standards and indicators for performance measurement
- enterprises' undertaking to government, based on a formal action plan to remedy any deficiencies in performance
- limits of management authority
- government's undertakings to the enterprise
- planning and budget approval procedure
- process for monitoring contract compliance
- management incentives and sanctions for non-performance
- procedures for arbitration and settlement of disputes

Prerequisites for successful negotiations and adherence to a contract require:

- clear and authoritative analysis of the enterprise's problems
- recognition, by government, of the problems
- commitment to action
- agreement to place relations on a stable long-term basis
- greater management autonomy, subject to performance monitoring

The main issues that arise in the implementation of contracts centre on:

- deciding who should represent the parties contract
- identifying and satisfying contract prerequisites
- setting appropriate targets
- establishing processes for monitoring, review and arbitration
- setting management authority limits

Representation of the parties to the contract can be a difficult and emotive issue, because the contract may require major changes in the attitude of government and the role and constitution of the enterprise's Board of Directors.

On the government side, representation may be made through the parent ministry or through a committee drawn from several interested ministries. Where government has been closely involved in running a public enterprise, the introduction of a performance contract probably requires bigger changes of attitude for the line ministry than for the enterprise. If the spirit of the contract is observed, the government's power to interfere in the day-to-day operations of the enterprise will be reduced; otherwise it is impossible to hold management responsible for unsatisfactory performance.

On the enterprise side, the executive management team must be able to determine policy and commit the enterprise to a contract. Frequently performance contracts result in a change in board membership to insure at least a majority of executive directors.

Contract prerequisites - the action required in preparation for contract drafting and negotiation includes:

- preparation of a corporate plan by enterprise management
- quantification and planned settlement of mutual indebtedness
- agreement on the definition and classification of commercial and non-commercial objectives
- agreement on the principle of rewards and sanctions and acceptance by government that rewards for

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better than expected performance may exceed normal public service pay level

- agreement on the appointment of an independent chairman or mediator. A mediator is required during the contract negotiations and to assist in resolving any subsequent disputed

Setting targets - experience has shown that reporting, monitoring and performance evaluation become unnecessarily difficult if too many indicators are selected. On the other hand a single indicator may lead to too narrow a management focus, particularly if a mix of financial, operational and service targets is to be met. It is important to ensure that the indicators reflect management's ability to manage. Where there is relative commercial freedom and a competitive market, profit-related measures are best (with adjustment for social obligations), but profit is rarely a good yardstick if it is influenced by factors outside management's control - for example, control over price setting.

Monitoring, review and arbitration - to ensure adequate performance monitoring and review, the enterprise will need to report in a prescribed format to the agency appointed by government for the purpose. The enterprise therefore needs adequate accounting and management information systems. The review body must have people with relevant industry sector experience to interpret the reports and to build rapport with enterprise management. The review body must be seen not as a watchdog but as a supportive group, objective but sympathetic to the enterprise's problems.

Management authority limits - a performance contract is often arranged for an enterprise that is classified as strategically important and that is intended to remain in the public sector for the foreseeable future. Government is therefore likely to want to retain control over some features of the enterprise's operations. These may include prices, quality and coverage of services to consumers and the level of users charges; in some countries controls may extend to personnel procedures and pay scales. As shareholder, government will also want some control over capital expenditure and level of borrowing. Some limits to management's authority will have to be included in the contract. These may be resisted by management, who will tend to view them as limitations to their 'commercial' outlook and autonomy. The need is for balance between government's right to ensure consistency with its macro economic and social objectives and the freedom and motivation of managers.

Source: Presidential Parastatal Sector Reform Commission, *Parastatal privatisation and reform: Masterplan* (Dar es Salaam: Government Printers, 1993).

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TANZANIA HARBOURS AUTHORITY PERFORMANCE ANALYSIS (1992/93)

ANNEX B2

ALL PORTS

FINANCIAL PERFORMANCE	ACTUAL	TARGET	OUT TURN % TARGET	POINTS AVAILABLE	TOTAL SCORE
a). Return on capital employed	11.33	7.32	154.76	20	30.96
b). Pre-tax profit margins	3,880,035,645	7,925,706,000	48.96	15	7.34
				35	38.30

DAR ES SALAAM PORT

OPERATIONS & QUALITY OF SERVICE	ACTUAL	TARGET	OUT TURN % TARGET	POINTS AVAILABLE	TOTAL SCORE
(a) Productivity					
- Gen Cargo (Tons/Gang/Shift)	171.20	140.00	122.29	4.00	4.89
- Container (moves per 24 hrs)	240.40	288.00	83.47	7.00	5.84
b). Ship turn-round (days in port)					
- Gen Cargo	3.80	4.00	105.26	3.00	3.16
- Container	2.70	2.40	88.89	6.00	5.33
c). Unit Costs					
i) Ship costs					
- Marine (per ship) \$	53.12	69.78	131.36	2.00	2.63
- Stevedoring					
Gen Cargo (per dwt) \$	1.35	0.77	57.04	2.00	1.14
Container (per TEU) \$	46.76	34.88	74.59	12.00	8.95
ii) Shipper costs					
- Shore handling					
Gen Cargo	1.28	1.41	110.16	2.00	2.20
Container (per TEU)	161.18	115.10	71.41	10.00	7.14
- Wharfage					
All cargo (per dwt)	1.55	5.12	330.32	2.00	6.61
				50.00	47.90

TANGA PORT

OPERATIONS & QUALITY OF SERVICE	ACTUAL	TARGET	OUT TURN % TARGET	POINTS AVAILABLE	TOTAL SCORE
a). Productivity					
- Gen Cargo (Tons/Gang/Shift)	193.80	170.00	114.00	6.00	6.84
b). Ship turn-round(days in port)					
- Gen Cargo	1.80	2.00	111.11	4.00	4.44
				10.00	11.28

MTWARA PORT

OPERATIONS & QUALITY OF SERVICE	ACTUAL	TARGET	OUT TURN % TARGET	POINTS AVAILABLE	TOTAL SCORE
a). Productivity					
- Gen Cargo (Tons/Gang/Shift)	80.00	110.00	72.73	2.50	1.82
b). Ship turn-round(days in port)					
- Gen Cargo	3.60	4.00	111.11	2.50	2.78
				5.00	4.60
GRAND TOTAL				100.00	102.08

APPENDIX B-I

TANZANIA HARBOURS AUTHORITY
EVALUATION OF PERFORMANCE TARGETS

July - Sept.

ALL PORTS	Month...	1945
FINANCIAL PERFORMANCE **	ACTUAL	TARGET
		%
a) Return on capital employed		13.90
b) Pre-tax profit margins (EXPRESSED AS % OF REVENUE)		12.50

DAR ES SALAAM	ACTUAL	TARGET
OPERATIONS & QUALITY OF SERVICE		
a) Productivity *		
- Gen Cargo (Tons/Gang/Shift)	133.47	140.00
- Container (moves per 24 hrs)	326.53	288.00
b) Ship turnaround (days in port) *		
- Gen. Cargo	4.07	4.00
- Containers	2.27	2.40
UNIT COSTS **		
a) Ship costs		
- Marine (per ship) \$		69.78
- Stevedoring		
- Gen Cargo (per dwt) \$		0.77
- Containers (per TEU) \$		34.88
b) Shipper costs		
- shore handling		
- Gen Cargo \$		1.41
- Containers (per TEU) \$		115.10

TANGA PORT	ACTUAL	TARGET
OPERATIONS & QUALITY OF SERVICE		
a) Productivity *		
- Gen Cargo (Tons/Gang/Shift)	184.00	170.00
b) Ship turnaround (days in port) *		
- Gen. Cargo	1.35	2.00

MTWARA PORT	ACTUAL	TARGET
OPERATIONS & QUALITY OF SERVICE		
a) Productivity *		
- Gen Cargo (Tons/Gang/Shift)	102.00	110.00
b) Ship turnaround (days in port) *		
- Gen. Cargo	3.00	4.00

SOURCE: * Directorate of Planning (Monthly Review.)
** Directorate of Finance

Three areas for investment are known by IPC: priority areas, controlled and reserved areas and activities reserved for local investors. The last type of areas is exclusively reserved for Tanzanians.

Priority areas for investment	
• natural resources	forestry, fishing and fish farming, game cropping for commercial purposes, wildlife ranching
• tourism	operation of tourist hotels, other accommodations, tourist transportation (including road transport, air charters and oceangoing vessels), provision of services related to tourism, such as tourist safaris (incl. licensed hunting, restaurants and photographic services)
• manufacturing industries	animal feed processing, agro-based industries, beverages, textiles, leather goods, steel and metal engineering, cement and ceramics, electrical engineering, printing and publishing, pharmaceutical, fish processing and canning, fish nets, packing, general processing, bottles and glass ware, paints, automotive engineering
• petroleum and mining	the exploration and production of: oil and gas, gold, diamonds, gemstones, and all other minerals, metallic and non-metallic
• construction	hotels and other tourist accommodation, residential houses, commercial buildings, warehouses, industrial sheds, estates and factory buildings
• transport	roads haulage, coastal shipping, air charters and air lines
• transit trade	activities relating to the transit of goods to neighbouring countries, and to the re-export of goods have value added in Tanzania
Controlled and reserved areas	
• controlled areas	investments large enough to qualify for the application of incentive packages under this policy statement and which are in the following areas of major economic importance. This area shall normally be reserved for public investment or joint public and private enterprises, <i>though exceptions may be made</i> : iron and steel production, machine tools manufacture, chemical fertilizer and pesticides production, airlines
• reserved areas	the following areas of strategic importance are reserved exclusively for investment by the public sector, <i>except where special licenses may be granted</i> . IPC will, from time to time, advise the government on such areas: the manufacture, marketing and distribution of armaments and explosives of all types, the generation and distribution of electricity in urban areas or through the national grid, the provision of public water for domestic and industrial purposes; the building and operation of all railways; radio and television broadcasting; postal and telecommunications services (but not necessarily the production of equipment and accessories thereof); insurance and assurance services; banks

APPENDIX B-II

Activities reserved for local investors	
<hr/>	
• exclusively reserved areas	retail or wholesale trade; product brokerage; business representation for foreign companies; operation of public relations business; operation of taxis; barber shops, hairdressing and beauty salons; butcheries; ice-cream making and parlours
• areas which foreign investors with less than US\$ 250,000 or some other amount which may be stipulated by IPC from time to time will be excluded	travel agencies; car hire service; bakeries, confectioneries and good processing for the local market; tailoring of garments for the domestic market; buildings repair and decoration units; manufacture of house and office furniture for the domestic market

 Transshipment of dry bulk (mt) in ports of Rotterdam and Dar es Salaam

	Port of Rotterdam		Dar es Salaam port	
1994	<i>total</i>	3,952,300	<i>total</i>	247,700
	grains	2,671,100	grains	193,800
	fertiliser	1,276,700	fertiliser	53,900
	sugar	4,500	sugar	-
1995	<i>total</i>	3,684,200	<i>total</i>	202,000
		2,493,600	grains	202,000
		1,186,100	fertiliser	-
		4,600	sugar	-

Source: Bulk grain/fertilizer handling returns - 1994, 1995, THA-grain terminal; Haven Informatie Bank, RMPM, 1994, 1995.

Bill of Lading

This document belongs to the transport agreement and has three functions:

- prove of receipt of load
- transport agreement between transporter and keeper of Bill of Lading
- gives keeper of Bill of Lading right to the load

Certificate of Shipment

In the Certificate of Shipment is written exactly which goods for transport are transhipped with a certain ship. Is handed out after departure.

Certificate of Loading

Document given out when export is allowed.

Certificate of Origin

This document is asked for by the buyer in case of goods from a certain country for which lower import tariffs apply.

Declaration and Disposal Order

Document which can be surrendered against goods (via other document: Gate Pass)

Export Acceptance and Shipping form

Custom's document which is handed out when export is allowed.

Freight Note

Document which can be surrendered against the goods (via other document: Notify Address)

Manifest

On the Manifest, data regarding the shipment are stated. Most often, data regarding the cargo and the freight are given on separate documents: Freight Manifest and Cargo Manifest.

Freight Manifest: document used to calculate the freight rate. Information on the document: weight in kilo's, freight tons, rate of freight, charges, etc.

Cargo Manifest: document with cargo information, like: number and kind of packages, gross weight, measurement volume of cargo and other remarks regarding the cargo.

Outturn Report

Report on which all discharging facts are stated: date of discharging, quantity of discharging and way of discharging. This report is written *after* the discharging.

Shipping Order

Document with general description of each shipment of cargo, the order number, weight of shipment, name and expected time of arrival of the vessel, the country of origin and port and country of destination.

Unloading List

On this list all facts regarding the coming discharging are stated: quantity of discharging, type of cargo, etc.

APPENDIX C-III

SUMMARY OF STATEMENTS OF FACTS

Arrival Date	Name	Tons discharged	No. of gangs	Tons/gang (m tons)	Tot. berth time (hrs)*	Delay (hrs)	time (%)
14-11-94	M.V. Al Baky	13.740	75	183	210	23,2	11,1
17-11-94	M.V. Ektor	19.950	92	217	240	38,0	15,8
25-01-95	M.V. Soya	9.800	42	233	133	32,1	24,2
27-02-95	M.V. Rokos Vergottis	14.118	70	202	193	51,2	26,5
5-04-95	M.V. Seapace	9.000	54	167	158	48,6	30,8
30-05-95	M.V. Lamda	12.318	69	179	198	43,6	22,0
20-06-95	M.V. Promina	15.000	41	366	n.a.	26,4	n.a.
11-03-95	M.V. Her An	13.150	54	244	190	56,7	29,9
12-05-95	M.V. Overseas Hariette	10.683	73	146	177	73,9	41,8
	Totaal	117.759	570	207	1497	393,7	24,5

* Time from berthing till last grab discharged

Note: with delay calculations in % M.V. Promina is excluded

cause	delay	time (hrs)	time (%)	av. berth time/ship
1	rain	81,7	20,7	hours 166
2	ship	20,9	5,3	days 6,9
3	shunting	0,4	0,1	tons/ship hr berth
4	transport	81,3	20,6	79
5	labour	104,5	26,6	
6	operational	34,3	8,7	% time gangs idle
7	crane	14,1	3,6	0,262922
8	power	46,0	11,7	
9	others	10,5	2,7	
		393,7	100,0	

At the next pages a summary of the statements of facts of each of the nine ships can be found.

The total delay is calculated as follows: (delay/no. of lines in operation) * no. of lines delayed

The causes of the delays is given in figures; the legend is shown below. Sometimes further explanation is given, but not all Statements of Facts were so detailed.

Note:	Delays veroorzaakt door transport zijn niet erg betrouwbaar, omdat het niet duidelijk is in hoeverre de lijnen werkelijk stilgelegd worden!
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Sheet2

					tons disch:	13740		
14-11-94	Delays M.V. AL BAKY				no. gangs:	75		
	no. of lines working: 1, 2 or 3				tons/gang:	183,2		
	cause of	no. of lines	delays	total				
	delays	of delay	(min)	delay (hrs)	comments			
	5	2	35	0,58				
	5	2	30	0,50				
	5	3	30	0,50				
	5	2	30	0,50				
	4	1	90	0,75				
	5	3	30	0,50				
	4	1	35	0,19	no. of lines unknown			
	4	1	50	0,28	no. of lines unknown			
	5	3	30	0,50				
	7	1	480	2,67	shore crane out of order			
	5	3	30	0,50				
	3	1	30	0,17	equipment transfer			
	5	3	60	1,00				
	5	3	30	0,50				
	4	1	55	0,31				
	5	3	20	0,33				
	9	1	30	0,17	unreadable; no. of lines unknown			
	5	2	30	0,50				
	3	1	15	0,13	equipment shift			
	5	3	30	0,50				
	4	1	45	0,25	no. of lines unknown			
	5	3	20	0,33				
	5	3	45	0,75				
	4	1	30	0,17	no. of lines unknown			
	6	1	30	0,17	bagging machine out of order			
	3	1	15	0,08	shore crane move			
	5	3	30	0,50				
	6	1	30	0,17	unreadable			
	4	1	120	0,67	no. of lines unknown			
	5	3	15	0,25				
	4	1	45	0,25				
	8	3	30	0,50				
	5	3	30	0,50				
	4	1	15	0,08	no. of lines unknown			
	5	3	15	0,25				
	4	1	45	0,25	no. of lines unknown			
	8	3	30	0,50				
	5	3	30	0,50				
	4	1	15	0,08	no. of lines unknown			
	5	3	30	0,50				
	4	1	120	0,67	no. of lines unknown			
	5	3	30	0,50				
	1	3	15	0,25				
	5	3	30	0,50				
	5	1	120	0,67	waiting for gang			
	5	3	30	0,50				
	5	3	30	0,50				
	5	3	30	0,50				

Sheet2

[illegible]

					tons disch.	19950
17-11-94	Delays M.V. Ektor				no. gangs	92
	no. of lines working: 1 or 3				tons/gang	217
	cause of	no. of lines	delays	total		
	delays	of delay	(min)	delay (hrs)		
	5	3	15	0,25		
	6	1	95	0,53		
	4	3	10	0,17		
	4	1	90	1,50		
	4	1	105	1,75		
	4	1	165	0,92		
	4	1	60	0,33		
	5	3	30	0,50		
	5	3	30	0,50		
	4	2	30	0,75		
	5	2	15	0,50		
	4	3	80	1,33		
	5	3	25	0,42		
	4	1	30	0,17		
	4	1	35	0,19		
	5	3	30	0,50		
	5	2	35	0,58		
	5	2	30	0,33		
	5	3	35	0,58		
	4	1	30	0,17		
	5	3	30	0,50		
	4	1	130	0,72		
	5	3	30	0,50		
	5	3	30	0,50		
	5	4	30	0,50		
	5	4	30	0,50		
	5	4	20	0,33		
	8	4	76	1,27		
	5	4	30	0,50		
	4	3	40	0,50		
	4	1	35	0,15		
	4	1	60	0,25		
	4	1	55	0,23		
	5	4	30	0,50		
	4;8	4	330	5,50		
	5	4	10	0,17		
	4	3	25	0,31		
	4	2	30	0,25		
	4	2	60	0,50		
	5	4	30	0,50		
	4	2	50	0,42		
	4	2	40	0,33		
	4	1	30	0,13		
	5	4	15	0,25		
	5	4	15	0,25		
	4	1	30	0,13		
	8	4	30	0,50		

Sheet3

	5	4	15	0,25		
	5	4	15	0,25		
	6	4	390	6,50	breakdown conveyorbelt	
	4	1	45	0,19		
	4	1	40	0,17		
	5	4	15	0,25		
	4	1	25	0,10		
	4	1	30	0,13		
	5	4	15	0,25		
	5	4	15	0,25		
	5	4	40	0,89		
	5	4	15	0,33		
	5	4	15	0,33		
			Total	38,04		
total delay: (delay / no. of lines in operation) * no. of lines delayed						

					tons disch:	9800	
25-01-95	Delays M.V. Soya				no. gangs:	42	
					tons/gang	233	
	cause of	no. of lines	delays	total			
	delays	of delay	(min)	delay (hrs)			
	2	3	90	1,50	waiting for ship		
	2	3	50	0,83	preparing ship		
	9	3	30	0,50	waiting for health officers		
	6	3	35	0,58	opening the hatches		
	5	3	30	0,50			
	6	1	180	1,00	empty bags bls		
	6	1	80	0,44	preparing plant		
	6	3	300	5,00	black out gt; unknown delay!		
	8	3	15	0,25			
	5	3	45	0,75			
	6	1	25	0,14	bagging plant out of order		
	5	3	30	0,50			
	4	3	45	0,75			
	5	3	30	0,50			
	5	3	45	0,75			
	5	3	40	0,67			
	4	1	50	0,28	no. of lines unknown		
	4	1	45	0,25	no. of lines unknown		
	6	1	35	0,19	bagging machine out of order		
	4	1	20	0,11	no. of lines unknown		
	5	3	20	0,33			
	4	2	80	0,89	no. of lines unknown		
	5	3	40	0,67			
	8	3	75	1,25			
	5	3	60	1,00			
	4	1	15	0,08	no. of lines unknown		
	5	3	40	0,67			
	8	3	120	2,00			
	7	1	135	0,75	crane out of order		
	5	3	330	5,50	lack of crane drivers		
	5	3	30	0,50			
	6	1	105	0,58	conveyor belt out of order		
	6	3	110	1,83	awaiting for bags		
	5	3	30	0,50			
			Total	32,06			

					tons disch:	14118	
28-02-95	Delays M.V. Rokos Vergottis				no. gangs:	70	
					tons/gang:	202	
	cause of	no. of lines	delays	total			
	delays	of delay	(min)	delay (hrs)			
	2	3	180	3,00	ship arrival		
	9	3	30	0,50	awaiting health officer		
	4	3	240	4,00	no trucks available		
	5	3	15	0,25			
	5	4	30	0,50			
	4	4	60	1,00			
	5	4	35	0,58			
	9	4	60	1,00	ramadan meal break		
	1	4	165	2,75			
	5	4	15	0,25			
	5	2	35	0,58			
	4	2	55	0,92	no trucks		
	5	4	30	0,50			
	9	4	60	1,00	ramadan meal break		
	5	4	15	0,25			
	1	4	100	1,67			
	5	4	30	0,50			
	4	2	30	0,25			
	4	1	45	0,19			
	5	4	35	0,58			
	4	2	10	0,08			
	4	1	15	0,06			
	1	4	75	1,25			
	4	4	45	0,75			
	5	4	20	0,33			
	5	4	30	0,50			
	8	2	410	3,42			
	8	2	90	0,75			
	8	4	270	4,50			
	4	2	40	0,67			
	1	2	70	1,17			
	5	4	35	0,58	low tonnage due to no trimming gangs!		
	8	4	240	4,00			
	1	4	60	1,00			
	5	1	45	0,19	awaiting for shore crane driver		
	5	1	30	0,13	awaiting for shore crane driver		
	5	2	35	0,58			
	5	2	25	0,42	low tonnage due to no trimming gangs		
	5	2	35	0,58			
	5	2	15	0,25			
	8	2	195	3,25			
	5	2	30	0,50			
	1	2	105	1,75			
	4	1	30	0,25			
	5	2	35	0,58			
	5	2	15	0,25			
	4	2	160	2,67			

	5	1	30	0,50			
			Total	51,23			

					tons disch:	9000		
5-04-95	Delays M.V. Seapace				no. gangs:	54		
	no. of lines working: 2 or 3				tons/gang:	167		
	cause of	no. of lines	delays	total				
	delays	of delay	(min)	delay (hrs)				
	2	3	480	8,00	vessel no working			
	5	3	30	0,50				
	9	3	90	1,50	waiting for agricult. officer order			
	5	3	35	0,58				
	5	2	15	0,25				
	5	2	30	0,50				
	5	2	30	0,50				
	4	1	30	0,25				
	4	1	50	0,42				
	5	2	30	0,50				
	6	1	45	0,38	waiting for pallets			
	5	2	60	1,00				
	4	1	35	0,29				
	1	2	45	0,75				
	5	3	15	0,25				
	1	3	340	5,67				
	5	3	35	0,58				
	6	3	70	1,17	preparing bagging machines			
	1	3	125	2,08				
	5	3	30	0,50				
	5	3	540	9,00	no labourers!			
	5	3	40	0,67				
	6	3	65	1,08	preparing bagging machines			
	1	3	60	1,00				
	7	1	30	0,17	crane out of order			
	1	3	30	0,50				
	7	1	5	0,03	crane out of order			
	1	3	60	1,00				
	5	3	30	0,50				
	1	3	15	0,25				
	5	3	30	0,50				
	4	1	30	0,17				
	5	3	45	0,75				
	7	1	435	2,42	crane out of order (impossible to work?) Crane from hatch			
	5	3	20	0,33				
	5	3	30	0,50				
	7	1	45	0,25	grab out of order			
	5	3	45	0,75				
	5	3	30	0,50				
	1	3	60	1,00				
	7	1	50	0,28	crane out of order hatch			
	5	3	30	0,50				
	1	3	20	0,33				
	6	1	80	0,44	one plant machine out of order			
			Total	48,58				

					tons disch:	12318	
30-05-95	Delays M.V. LAMBDA				no. gangs:	69	
	no. of lines working: 2 or 3				tons/gang:	179	
	cause of	no. of lines	delays	total			
	delays	of delay	(min)	delay (hrs)			
	2	3	180	3,00	awaiting ship arrival		
	9	3	40	0,67	awaiting port health officers		
	2	3	20	0,33	preparing ship		
	9	3	210	3,50	awaiting health officer		
	2	3	90	1,50	awaiting ship's order		
	4	3	300	5,00			
	5	3	30	0,50			
	6	3	150	2,50	awaiting for empty bags		
	8	3	30	0,50			
	5	3	30	0,50			
	5	3	30	0,50			
	4	2	40	0,44			
	4	3	150	2,50	stop discharging due to no trailer!!!		
	5	3	30	0,50			
	6	3	170	2,83	awaiting empty bags		
	8	3	30	0,50			
	5	3	15	0,25			
	5	3	20	0,33			
	5	3	30	0,50			
	4	1	60	0,33	no. of lines unknown		
	5	3	30	0,50			
	6	1	15	0,08	no. of lines unknown		
	5	3	30	0,50			
	8	3	45	0,75			
	5	3	50	1,25			
	4	1	20	0,17			
	4	1	10	0,08			
	4	1	40	0,33			
	4	1	30	0,25			
	4	1	30	0,25			
	4	1	20	0,17			
	4	1	30	0,25			
	5	3	15	0,25			
	4	1	30	0,17			
	4	1	25	0,14			
	4	1	105	0,58			
	4	1	80	0,44			
	5	3	30	0,50			
	8	3	55	0,92			
	5	3	15	0,25			
	4	1	75	0,42			
	5	3	30	0,50			
	4	1	75	0,42			
	4	1	130	0,72			
	5	3	30	0,50			
	6	1	65	0,36	bagging plant belt break down		
	8	3	115	1,92			

Sheet7

	5	3	10	0,17			
	4	1	30	0,17			
	5	3	30	0,50			
	4	1	125	0,69			
	5	2	35	0,58			
	5	2	15	0,25			
	7	1	60	0,50	shore crane out of order		
	1;5	2	45	0,75			
	8	2	15	0,25			
	5	1	20	0,33			
			Total	43,56			

20-06-95	Delays M.V. Promina				tons disch:	15000	
	no. of lines working: 1 or 3				no. of gangs:	41	
					tons/gang:	366	
	cause of	no. of lines	delays	total			
	delays	of delay	(min)	delay (hrs)			
	5	3	10	0,17			
	4	3	105	1,75			
	5	3	35	0,58			
	4	3	45	0,75			
	4	3	120	2,00			
	4	3	60	1,00			
	5	3	5	0,08			
	4	3	45	0,75			
	8	1	105	0,58			
	8	1	180	0,58			
	5	3	35	1,00			
	4	3	75	1,25			
	5	3	40	0,67			
	4	3	90	1,50			
	5	3	10	0,17			
	5	3	60	1,00			
	5	3	35	0,58			
	4	1	65	0,36			
	5	3	30	0,50			
	4	3	50	0,83	town trucks		
	5	3	40	0,67	partly late arrival, partly allocation		
	4	3	40	0,67			
	5	3	60	1,00	late arrival		
	4	3	480	8,00			
			Total	26,44			

					tons disch:	13150	
11-03-95	Delays M.V. Her An				no. gangs:	54	
	no. of lines working: 1, 2 or 3				tons/gang:	244	
	cause of	no. of lines	delays	total			
	delays	of delay	(min)	delay (hrs)			
	7	1	60	1,00	crane out of order		
	5	3	10	0,17			
	1	3	395	6,58			
	7	1	20	0,11	crane out of order		
	4	3	40	0,67	no. of lines unclear		
	5	3	55	0,92			
	5	3	45	0,75			
	7	1	45	0,25	crab out of order		
	7	1	60	0,33	crab out of order		
	7	1	209	1,16	crab out of order		
	6	1	180	1,00	bagging machine out of order		
	5	3	30	0,50			
	7	1	150	0,83	crane out of order		
	6	1	450	2,50	bagging machine out of order		
	5	3	60	1,00			
	1,8	3	360	6,00			
	5	3	30	0,50			
	1	3	60	1,00			
	8	3	195	3,25			
	5	3	30	0,50			
	5	3	70	1,17			
	1	3	130	2,17			
	1	3	125	2,08			
	5	3	30	0,50			
	5	3	50	0,83			
	6	1	50	0,28	break down plant		
	6	1	60	0,33	break down plant		
	5	3	35	0,58			
	6	1	105	0,58	conveyor belt out of order		
	8	3	20	0,33			
	5	3	30	0,50			
	9	1	35	0,19	transfer of bagging machine		
	1	3	290	4,83			
	5	3	70	1,17			
	1	3	55	0,92			
	1	3	50	0,83			
	5	3	35	0,58			
	1	3	30	0,50			
	5	3	20	0,33			
	1	3	180	3,00			
	5	3	60	1,00			
	1	3	180	3,00			
	5	3	30	0,50			
	5	3	60	1,50			
			Total	56,74			

					tons disch:	10683		
10-05-95	Delays M.V. Overseas Hariette				no. gangs:	73		
	no. of lines working: 2 or 3				tons/ gang	146		
	cause of	no. of lines	delays	total				
	delays	of delay	(min)	delay (hrs)				
	2	2	15	0,25	waiting for ship arrival			
	9	2	45	0,75	waiting for port health and immigration officers			
	5	2	30	0,50				
	6	2	90	1,50	preparing plant machines			
	7	1	210	1,75	crab out of order			
	2	2	150	2,50				
	5	3	30	0,50				
	6	1	60	0,33	preparing plant machines			
	4	3	90	1,50				
	4	1	75	0,42	no. of lines unclear			
	4	1	75	0,42	no. of lines unclear			
	4	1	60	0,33	no. of lines unclear			
	5	3	30	0,50				
	4	3	105	1,75				
	4	3	58	0,97				
	1	3	20	0,33				
	1	3	15	0,25				
	1	3	20	0,33				
	4	3	70	1,17				
	8	3	45	0,75				
	6	1	90	0,50	bagging machine out of order			
	5	2	35	0,58				
	6	1	45	0,38	waiting for bit			
	6	1	15	0,13	belt out of order			
	6	1	45	0,38	waiting for bit			
	6	1	60	0,50	belt out of order			
	4	1	60	0,33				
	4	1	30	0,17				
	4	1	30	0,17				
	4	1	60	0,33				
	4	1	10	0,06				
	4	1	20	0,11				
	5	3	40	0,67				
	4	1	30	0,17				
	9	1	60	0,33	late start			
	4	1	15	0,08				
	4	1	35	0,19				
	4	1	50	0,28				
	5	2	10	0,17				
	4	1	30	0,25				
	4	1	45	0,38				
	1	2	160	2,67				
	1	3	225	3,75				
	5	3	45	0,75				
	8	2	65	0,72				
	5	3	35	0,58				
	4	1	125	0,69	no. of lines unclear			

Sheet10

	4	1	100	0,56	no. of lines unclear		
	4	1	45	0,25	no. of lines unclear		
	8	3	15	0,25			
	5	3	25	0,42			
	1	3	25	0,42			
	1	3	150	2,50			
	1	3	330	5,50			
	5	3	25	0,42			
	1	3	60	1,00			
	5	3	25	0,42			
	8	3	25	0,42			
	8	3	15	0,25			
	8	3	30	0,50			
	1	3	60	1,00			
	4	1	45	0,25	no. of lines unclear		
	4	1	120	0,67			
	1	3	330	5,50			
	5	3	15	0,25			
	5	3	35	0,58			
	8	3	35	0,58			
	1	3	20	0,33			
	1	3	30	0,50			
	1	3	45	0,75			
	8	3	5	0,08			
	5	3	15	0,25			
	4	1	10	0,06	no. of lines unclear		
	4	1	0	0,00	unreadable		
	4	1	0	0,00	unreadable		
	1	3	0	0,00	unreadable		
	5	3	30	0,50			
	4	3	60	1,00	no. of lines unclear		
	8	3	210	3,50			
	5	3	45	0,75			
	1	3	45	0,75			
	5	3	15	0,25			
	1	3	10	0,17			
	1	3	105	1,75			
	1	3	60	1,00			
	4	3	85	1,42	no. of lines unclear		
	7	1	205	1,14	crane out of order		
	8	3	30	0,50			
	5	3	30	0,50			
	8	3	30	0,50			
	7	1	90	0,50	crane out of order		
	5	3	30	0,50			
	4	3	10	0,17			
	9	3	30	0,50	waiting for the cargo to be trimmed from the hatch		
	1	3	155	2,58			
	4	1	20	0,11	no. of lines unclear		
			Total	73,88			

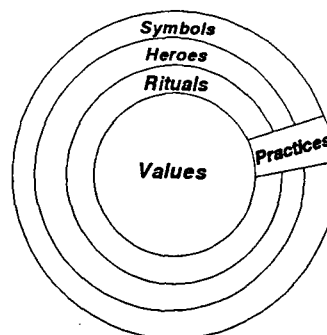
GENERAL

In his book *Culture's consequences* Hofstede explores the differences in thinking and social action that exist between members of 40 different modern nations.² He argues that people carry 'mental programs', which are developed in the family in early childhood and reinforced in schools and organisations, and that these mental programs contain a component of national culture. Hofstede identifies four main dimensions along which dominant value systems in the 40 countries can be ordered and which affect human thinking, organisations and institutions in predictable ways. In those 40 countries employees co-operated in the research. Hofstede's next book, a sequel to his earlier work, was written to help in dealing with the differences in thinking, feeling and acting of people around the globe.³ Again the dimensions were measured, this time employees of 50 countries and three geographical regions were involved in the survey. Both books show that although the variety in people's mind is enormous, there is a structure in this variety which can serve as a basis for mutual understanding. The books deal with culture differences. Culture here does not mean 'civilisation' or 'refinement of the mind', as it is often used, but is meant as the way anthropologists use it, as a collective phenomenon.

What is culture?

Culture is a collective phenomenon, because it is at least partly shared with people who live or lived within the same social environment, which is where it was learned. According to Hofstede culture is covered by symbols, heroes, rituals and values. In figure 1 these are illustrated as the skins of an onion, indicating that symbols represent the most superficial and values the deepest manifestations of culture, with heroes and rituals in between.

Figure 1
The 'onion diagram': manifestations of culture at different levels of depth



¹ There are truths on this side of the Pyrenees which are falsehoods on the other

² Hofstede, G., *Culture's consequences; International differences in work-related values* (Beverly Hills-London: Sage Publications 1980).

³ Hofstede, G., *Cultures and organizations; Software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company, 1991).

Social anthropology has developed in the first half of the twentieth century and with its development it became clear that people in all societies, modern or traditional, face the same basic problems. In 1954 two Americans, the sociologist Alex Inkeles and the psychologist Daniel Levinson, published a broad survey of the English language literature on national culture. They found four issues as common basic problems worldwide, with consequences for the functioning of societies, of groups within those societies, and of individuals within those groups: relation to authority, conception of self in particular the relationship between individual and society and the individual's concept of masculinity and femininity and ways of dealing with conflicts, including the control of aggression and the expression of feelings [Inkeles and Levinson, 1969, p.447]. Twenty years later Hofstede collected data about the values of people in over 50 countries around the world. A statistical analysis of the answers on questions about the values of matched groups in different countries revealed common problems, but with solutions differing from country to country, in the following areas:

- social inequality, including the relationship with authority;
- the relationship between the individual and the group;
- concepts of masculinity and femininity: the social implications of having been born as a boy or a girl;
- ways of dealing with uncertainty, relating to the control of aggression and the expression of emotions.

Culture expressed in four dimensions

Hofstede found four dimensions of cultures. A dimension is an aspect of a culture that can be measured relative to other cultures. The basic problem areas correspond to dimensions which Hofstede named power distance (from small to large), collectivism versus individualism, femininity versus masculinity and uncertainty avoidance (from weak to strong). Each of these terms existed already in some part of the social sciences and they seemed to apply reasonably well to the basic problem area each dimension stands for. Together they form a four-dimensional model of differences among national cultures. Each country in this model is characterized by a score on each of the four dimensions. The scores are relative and not absolute, a country's score expresses how this particular country scores compared to the other countries. Recently a fifth dimension of differences among national cultures was identified: a long-term orientation in life to a short-term orientation. This dimension was discovered by a Canadian, when he was located in the Far East for many years. He studied people's values around the world using a questionnaire composed by Chinese people. This discovery shows that even the minds of the researchers studying culture are biased by their own cultural framework. This fifth dimension will be kept out of the focus in this essay.

The first dimension Hofstede measured was *power distance*, which is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally. Institutions are defined as the basic elements of society like the family, school and the community and with organisations the places where people work are meant. Power distance reflects the range of answers found in the various countries to the basic question of how to handle the fact that people are unequal. The power distance score of a certain country is a relative score to that of other countries. From the mean scores Hofstede developed a power distance index (PDI), which can be calculated for each country.

The second dimension is a measurement of the degree of individualism in society. Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself and his or her immediate family. Collectivism as its opposite pertains to societies in which people from birth onwards are integrated into strong, cohesive ingroups, which throughout people's

lifetime continue to protect them in exchange for unquestioning loyalty. With the help of a statistical analysis, the countries' scores are expressed in an individualism index (IDV).

Masculinity versus femininity is the third dimension of societal culture. Masculinity pertains to societies in which social gender roles are clearly distinct (i.e., men are supposed to be assertive, tough and focused on material success whereas women are supposed to be more modest, tender and concerned with the quality of life). Femininity pertains to societies in which social gender roles overlap (i.e., both men and women are supposed to be modest, tender and concerned with the quality of life). The countries' scores are expressed in the masculinity index (MAS). This dimension is the only one on which the men and women among the group tested scored consistently different, except, in countries at the extreme feminine pole.

Uncertainty avoidance, from strong to weak, is Hofstede's last dimension and defined as the extent to which the members of a culture feel threatened by uncertain or unknown situations. The countries' scores are expressed in the uncertainty avoidance index (UAI). The UAI is independent of occupation and sex, but there is a correlation between age and the UAI.

The effects of the dimensions in the work place

Although the research report's interest is primarily the consequences of the each dimension for functioning of organisations, not only the consequences in society and the workplace, but also in families and schools are summarized in tables. This is because most people grow up in a family structure and experience their first 'cultural programming' within family structures and school system. Later in life, the parent-child and teacher-student relation is complemented with a boss-subordinate relation. For that reason it should not surprise anybody when attitudes towards parents, especially fathers, and towards teachers, which are part of the mental programming, are transferred towards bosses. The tables can be found after discussion of the consequences of cultural differences in the work place.

In the large power distance situation society exists of many layers, and people from lower layers do not expect to be treated as equal by people from higher layers. In the work place this means that superiors and subordinates consider each other as existentially unequal: the hierarchical system is felt to be based on this existential inequality. Organisations centralise power as much as possible in a few hands. Subordinates are expected to be told what to do. In the small power distance society less layers are known and the layers are seen as unwanted. People are supposed to be equal to each other, unless their position is unequal. The consequences of this attitude in work places are that subordinates and superiors consider each other as existentially equal: the hierarchical system is just an inequality of roles, established for convenience and roles may be changed. Organisations are fairly decentralised, with flat hierarchical pyramids and limited numbers of supervisory personnel. In table 1, these and other aspects which go with the power distance are summarized. It has to be said that within countries with a high PDI, Hofstede found that the large power distance applied to all employees, those with high-status as well as those with low status. In countries with a small power distance, these middle and higher status employees scored significantly lower on PDI than less educated employees. Those employees preferred a power distance almost as high as their colleagues in the large PDI countries.

Table 1

Key differences between small and large power distance societies general norm, family, school and workplace (PDI)	
small power distance	large power distance
<ul style="list-style-type: none"> • inequalities among people should be minimized • there should be, and there is to some extent, interdependence between less and more powerful people • parents treat children as equals; children treat parents as equals • teachers expect initiatives from students in class • teachers are experts who transfer impersonal truths • students treat teachers as equals • more educated persons hold less authoritarian values than less educated persons • hierarchy in organisations means an inequality of roles, established for convenience • decentralisation is popular • narrow salary range between top and bottom of organisation • subordinates expect to be consulted • the ideal boss is a resourceful democrat • privileges and status symbols are frowned upon 	<ul style="list-style-type: none"> • inequalities among people are both expected and desired • less powerful people should be dependent on the powerful; in practice, less powerful people are polarized between dependence and counterdependence • parents teach children obedience; children treat parents with respect • teachers are expected to take all initiatives in class • teachers are gurus who transfer personal wisdom • students treat teachers with respect • both more and less educated persons show almost equally authoritarian values • hierarchy in organisations reflects the existential inequality between higher-ups and lower-downs • centralisation is popular • wide salary range between top and bottom of organisation • subordinates expect to be told what to do • the ideal boss is a benevolent autocrat or good father • privileges and status symbols for managers are both expected and popular

Source: Hofstede, G., Cultures and organizations; software of the mind, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.37).

In an individualist culture, people look after themselves and their nuclear family only. People are supposed to develop an identity and learn to think for themselves. For employees this means that they act according to their own interest and that work should be organised in such a way that this self-interest and the employer's interest coincide. In a collectivist culture, people are born into extended families or other ingroups from which the people derive their identity. In exchange for loyalty the group will protect people. If an employer in a collectivist country does not respect the societal norm to treat their employees as ingroup members, the employees will not repay the employer in terms of loyalty. The key differences in general, in the family structures and in the workplace between collectivist and individualist societies are shown in table 2.

Table 2

Key differences between collectivist and individualist societies general norm, family, school and workplace (IDV)	
collectivist	individualist
<ul style="list-style-type: none"> • people are born into extended families or other ingroups which continue to protect them in exchange for loyalty • identity is based in the social network to which one belongs • children learn to think in terms of 'we' • harmony should always be maintained and direct confrontations avoided • high-context communication • trespassing leads to shame and loss of face for self and group • purpose of education is learning how to do • diplomas provide entry to higher status groups • relationship employer-employee is perceived in moral terms, like a family link • hiring and promotion decisions take employees' ingroup into account • management is management of groups • relationship prevails over task 	<ul style="list-style-type: none"> • everyone grows up to look after him/herself and his/her immediate (nuclear) family only • identity is based in the individual • children learn to think in terms of 'I' • speaking one's mind is a characteristic of an honest person • low-context communication • trespassing leads to guilt and loss of self-respect • purpose of education is learning how to learn • diplomas increase economic worth and/or self-respect • relationship employer-employee is a contract supposed to be based on mutual advantage • hiring and promotion decisions are supposed to be based on skills and rules only • management is management of individuals • task prevails over relationship

Source: Hofstede, G., *Cultures and organizations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.67).

In feminine cultures, quality of life and caring for others are dominant values, while in masculine cultures material success and progress are most important. As mentioned above, this dimension is the only one on which the men and the women in group tested scored consistently different. The only exception was found in countries at the extreme feminine pole. The consequences of a feminine culture in the workplace are that people work in order to live, against people who live in order to work in masculine cultures. In feminine cultures, conflicts are solved by compromise and negotiation, while in masculine cultures they are fought out. The key differences are shown in table 3.

Table 3

Key differences between feminine and masculine societies general norm, family, school and workplace (MAS)	
feminine	masculine
<ul style="list-style-type: none"> • dominant values in society are caring for others and preservation • people and warm relationships are important • everybody is supposed to be modest • both men and women are allowed to be tender and to be concerned with relationships • in the family, both fathers and mothers deal with facts and feelings • both boys and girls are allowed to cry but neither should fight • sympathy for the weak • average student is the norm • failing in school is a minor accident • friendliness in teachers appreciated • boys and girls study same subjects • work in order to live • managers use intuition and strive for consensus • stress on equality, solidarity and quality of work life • resolution of conflicts by compromise and negotiation 	<ul style="list-style-type: none"> • dominant values in society are material success and progress • money and things are important • men are supposed to be assertive, ambitious and tough • women are supposed to be tender and to take care of relationships • in the family, fathers deal with facts and mothers with feelings • girls cry, boys don't; boys should fight back when attacked, girls should not fight • sympathy for the strong • best student is the norm • failing in school is a disaster • brilliance in teachers appreciated • boys and girls study different subjects • live in order to work • managers expected to be decisive and assertive • stress on equity, competition among colleagues, and performance • resolution of conflicts by fighting them out

Source: Hofstede, G., *Cultures and organizations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.96).

Uncertainty avoidance in which culture differences can be expressed. In countries with a low UAI, people feel comfortable in ambiguous situations and with unfamiliar risks. There should be no more rules than are strictly necessary and the ones which exist are respected. In the working place, people feel comfortable when being lazy and work only hard when this is necessary. Precision and punctuality have to be learned. In countries with a high score on uncertainty avoidance, people have fear of ambiguous situations and of unfamiliar risks. There is an emotional need for rules, even if these are impractical, not used or unfeasible. People work hard by an inner urge and are precise and punctual. In table 4, more key differences are given.

Table 4

Key differences between weak and strong uncertainty avoidance societies general norm, family, school and workplace (UAI)	
weak uncertainty avoidance	strong uncertainty avoidance
<ul style="list-style-type: none"> • uncertainty is a normal feature of life and each day is accepted as it comes • low stress; subjective feeling of well-being • aggression and emotions should not be shown • comfortable in ambiguous situations and with unfamiliar risks • lenient rules for children on what is dirty and taboo • what is different, is curious • students comfortable with open-ended learning situations and concerned with good discussion • teachers may say 'I don't know' • there should not be more rules than is strictly necessary • time is a framework for orientation • comfortable feeling when lazy; hard-working only when needed • precision and punctuality have to be learned • tolerance of deviant and innovative ideas and behavior • motivation by achievement and esteem or belongingness 	<ul style="list-style-type: none"> • the uncertainty inherent in life is felt as a continuous threat which must be fought • high stress; subjective feeling of anxiety • aggression and emotions may at proper times and places be ventilated • acceptance of familiar risks; fear of ambiguous situations and of unfamiliar risks • tight rules for children on what is dirty and taboo • what is different, is dangerous • students comfortable in structured learning situations and concerned with the right answers • teachers supposed to have all the answers • emotional need for rules, even if these will never work • time is money • emotional need to be busy; inner urge to work hard • precision and punctuality come naturally • suppression of deviant ideas and behavior; resistance to innovation • motivation by security and esteem or belongingness

Source: Hofstede, G., *Cultures and organizations; software of the mind*, Institute for Research on Intercultural Cooperation (IRIC) (London: McGraw-Hill Book Company Limited, 1991, p.125).

From the four dimensions of national culture, power distance and uncertainty avoidance in particular affect people's functioning in organisations. In each organisation the power distribution is important (who has the power to decide what). What rules or procedures have to be followed to attain the desired goals also is of great importance. By plotting power distance and uncertainty avoidance against each other, the position of a country in the diagram should tell how organisational problems in a country would be solved.