Compilation of a detailed business plan for National Ports Authority of South Africa: Dredging Services.

By

Carl Sunil Gabriel

911308881

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Supervisor: Professor W.D. Geach
Graduate School of Business , University of KwaZulu Natal

STATEMENT

With the signature below I, Carl Sunil Gabriel, hereby declare that the work that I present in this thesis is based on my own research, and that I have not submitted this thesis to any other institution of higher education to obtain an academic qualification.

C.S. Gabriel Pr. Eng. , Student number 911308881 Date 05/12/2007

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CHAPTER 1: INTRODUCTION

1.1 THE DREDGING SERVICES BUSINESS CASE

Transnet Limited is a public company with the South African Government as its sole shareholder. As the holding company behind South Africa's largest transport businesses, Transnet is responsible for making sure that the country's transport industries operate to world-class standards and they also form an integral part of the overall economy.

Transnet is transforming into a focused freight transport and logistics company comprising its ports, rail and pipeline assets. This refocus is designed to ensure that the company delivers a reliable, consistent, safe and integrated freight service to all its customers; an acceptable rate of return to its shareholder; and is a choice and sustainable employer.

As a result of this transformation, all those assets or businesses which do not form part or support that strategy of building a world-class freight transport and logistics company are being disposed of either by selling them to the private sector or are being transferred back to the South African government.

Transnet's Four-Point Turnaround Strategy (Source: www.transnet.net) encompasses four vital areas:

1. Redirect and Re-engineer the Business

This pillar is aimed at improving efficiencies and effectiveness of the core business units through re-engineering processes and realising synergies between the various operating divisions. Within this pillar, a far-reaching programme has been launched to improve efficiencies, reduce costs and deliver a reliable service to all clients and increase market share.

2. Restructuring the Balance Sheet

This pillar seeks to rationalise the business portfolio and achieve a better focus on the core business units. Non-core businesses will be transferred to government and others will be sold. The proceeds will be used to fund the R40 billion infrastructure investment and reduce borrowing.

3. Ensure Corporate Governance and Risk Management

This pillar is designed to ensure the highest standards of corporate governance are adhered to and the company's risk management is improved. A fraud prevention plan and ethics programme have been launched.

4. Develop Human Capital

This is focused on revitalising human resources by transforming the culture and behaviour of employees. Transnet aims to be an employer of choice. The aim of this pillar is to increase talent management and leadership development, transformation management as well as performance and reward management.

Transnet is made up of the following operating divisions:

- Transnet Freight Rail (formerly Spoornet – the freight rail division)
- Transnet Rail Engineering (formerly Transwerk - the rolling stock maintenance business)
- Transnet National Ports Authority (formerly the NPA - fulfils the landlord function for South Africa's port system)
- Transnet Port Terminals (formerly SAPO - managing port and cargo terminal operations in the nation's leading ports), and
- Transnet Pipelines (formerly Petronet - the fuel and gas pipeline business, pumps and manages the storage of petroleum and gas products through its network of high-pressure, long distance pipelines)

Transnet National Ports Authority

Transnet National Ports Authority (NPA) is the custodian of the country's primary trading hubs, managing the most vital conduits of the country's imports and exports. Eight of the country's major seaports are controlled and managed by the NPA namely; Richards Bay, Durban, Saldanha, Cape Town, Port Elizabeth, east London, Mossel Bay and Ngqura (Coega) in the Eastern Cape. **(Source: www. transnet.net)**

The NPA offers a combination of port facilities and services which compliment each other. Each port has a natural hinterland with a defined market, which drives the nature of services, facilities and the types of cargo handled at each port. Consequently, each port operates and develops its own service, which in turn supports a defined customer base.

A fundamental factor that links all of these ports is that they all operate against the backdrop of a rapidly increasing trade resulting from the country's economic growth and globalisation. These operational issues include:

- rapidly changing technology
- the bargaining power of buyers and suppliers
- the emergence of global terminal operators
- ever-changing distribution patterns

Sustainability is emerging as a key issue, influencing new development, current operations and relationships with a wide range of national and international partners. Implicit in the concept of sustainability are the factors described below.

The efficiency of the country's ports and the sustainability of their operating methods are central to the country's larger economy. As the primary conduit for trade, the ports serve as gateways between South African and world economies. (Source: www.transnet.co.za)

NPA vision (Source: NPA Business Plan: 2006)

To be a transformed, collaborative port authority that leads economic growth in a world class port system

NPA mission statement (Source: NPA Business Plan: 2006)

To create and sustain world class freight and logistics solutions.

Dredging Services (DS) is a business unit of the NPA performing maintenance dredging of the South African ports as well as conducting hydrographic surveys.

According to Internet source 8, Dredging Services has operated as a separate business unit since 1988, and has been "ring fenced" since 1 April 1990 as per instruction of the Minister Trade and Logistics.

Primarily Dredging Services was established (by the National Ports Authority) as a separate business unit, to reduce the cost of maintenance dredging to the ports as each Port was then equipped with its own Dredging capability. This was achieved by combining the dredging capability that was distributed throughout the ports under the control of a single business unit, with sufficient capacity to service all ports with a substantially reduced asset base. The initial strategy was therefore one of improving operating arrangements and rationalising the size of the fleet. Since then, the strategic focus has been on improving the effectiveness and efficiency of dredging operations.

Up until 31 March 2000, DS (Dredging Services) was required, by the National Ports Authority, to work on a breakeven principle. DS's previous focus has therefore resulted in a "service" centre strategy, as opposed to a "profit" centre strategy. This has left DS in the current situation where assets are not optimally utilised, and profitability is sub-par. Since then however, following agreement with NPA Leadership, DS has been mandated to generate an initial net profit equal to at least the amount of the annual depreciation of the two trail dredgers. Prior to the revaluation exercise, these two dredgers were fully depreciated in DS's assets register.

From 2002-2007 DS has been plagued by accidents and equipment failure as the current dredging fleet has surpassed their design life. The case for repositioning is thus exceptionally strong, and the necessity absolute, if DS is to exist as a sustainable business unit. DS therefore needs to embark on a repositioning exercise to indicate where the strategic focus for the next 5 years should be.

DS aims to provide a variety of services including dredging and hydrographic project planning and management.

Hydrographic surveys are used to provide regular information that can assist this unit to function professionally.

Other services include:

- Depth Management;
- Dam Survey and Dredging;
- Consultancy services including training; and

Maintenance dredging involving: bow-pipe dredging, side trail dredging, grab dredging, bed levelling, reclamation, and beach nourishment.

Dredging Services vision

Dredging Services strives to be the preferred supplier of port maintenance dredging and hydrographic survey services in Southern Africa

Dredging Services mission statement

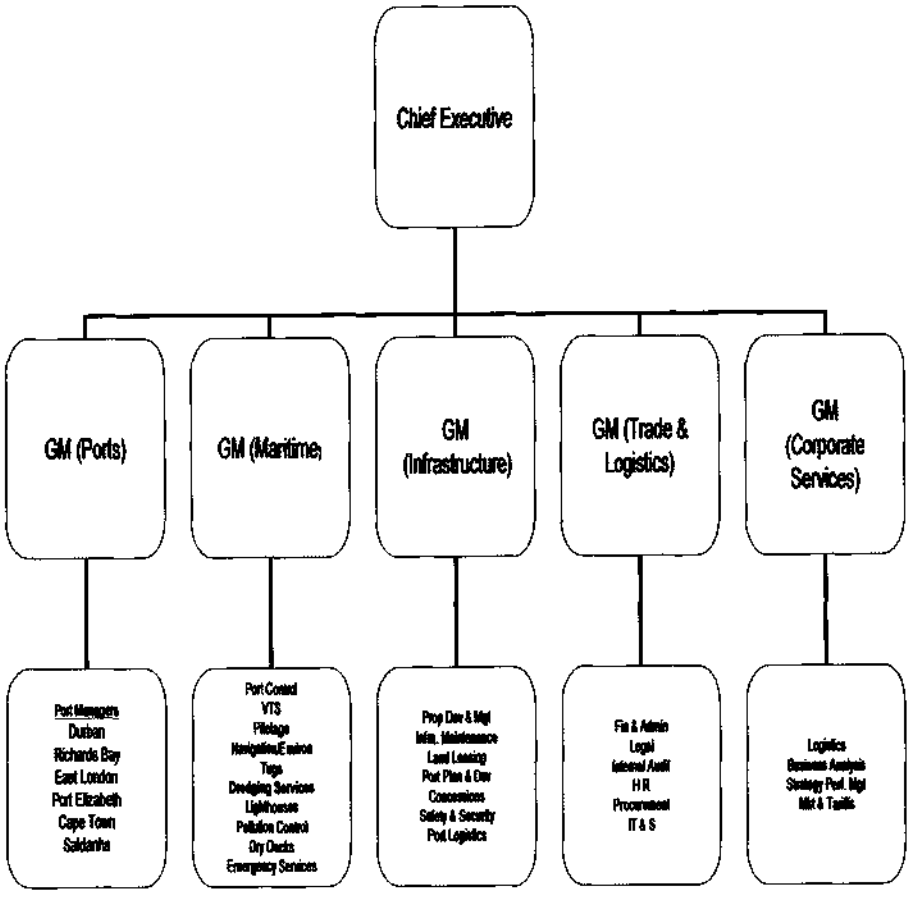
To transform Dredging Services into a viable sustainable business by optimising resources to realize future market opportunities. (Source: DS Business Plan 2006/2007).

Since 1990, Dredging Services has been ring-fenced (this means that Dredging Services was made (by Transnet) to be a completely separate business unit from the various Ports,

with its own Income Statement and Balance Sheet) as a stand alone business unit of the NPA. During this ten year period, several strategic (medium term) plans, and annual business plans have been drawn up. The main strategic focus from 1990 to 1997 was rationalisation of the dredging fleet, and from 1997 onwards the strategic focus has been on improving the efficiency and effectiveness of the dredging operations.

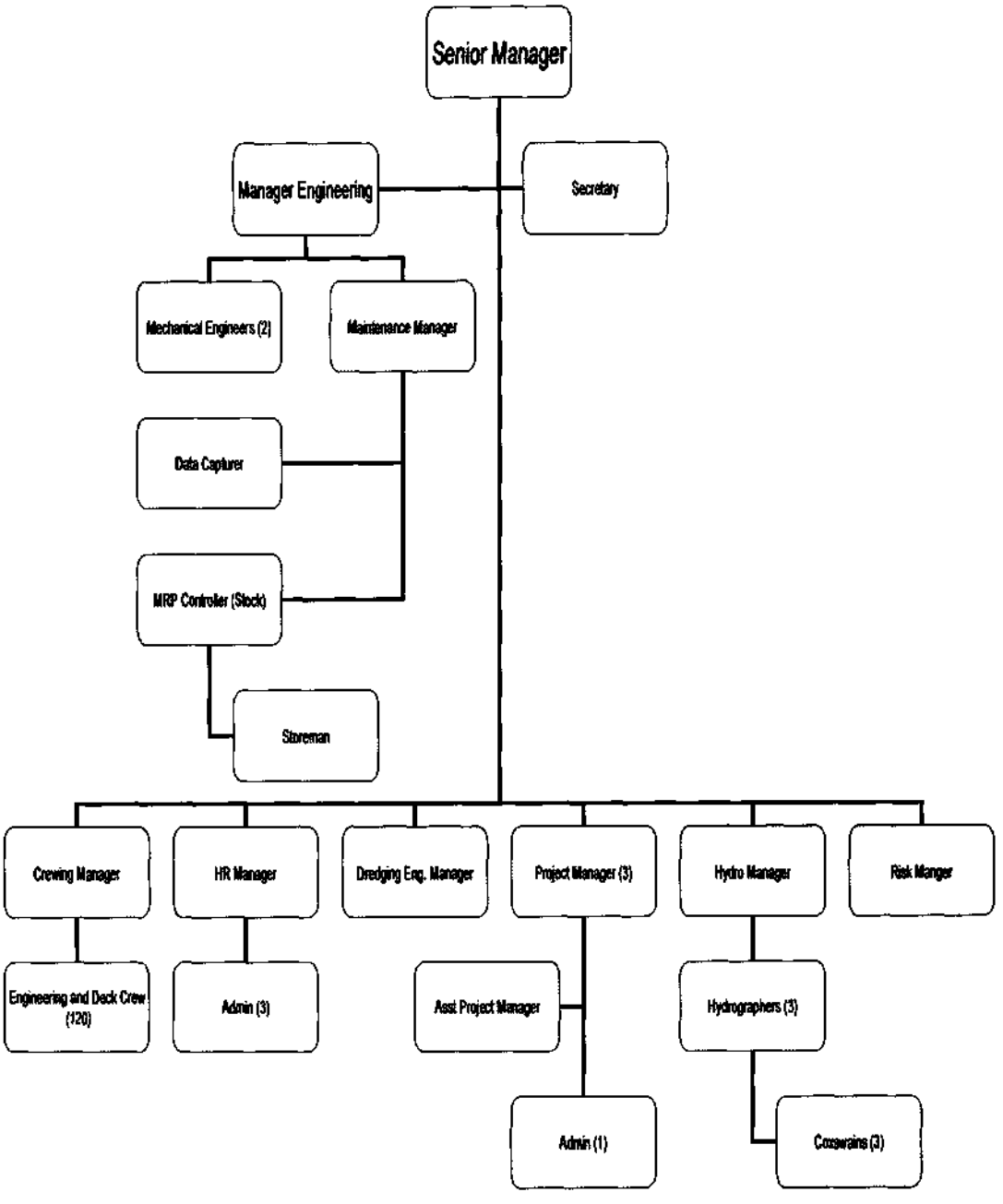
The DS strategy was changed in the 2002/2003 financial year where the following applied:
The fleet capacity will be fully utilised in meeting the NPA ports requirements for 2002/2003. The services of a marketing official allocated to Maritime services was utilised to conduct a potential market survey for maintenance dredging prospects in the Southern African Region (Source: DS Business Plan 2002/2003).

National Ports Authority Organogram



Source: Adapted from www.npa.co.za

Dredging Services Organogram



Source: Dredging Services Organisational Structure Document, 2006

Core activities of Dredging Services (Source: DS Annual Budget 2005/2006)

Maintenance Dredging (approx 97% of revenue)

Hydrographic Survey (approx 3% of revenue)

Customer analysis (Source: DS Annual Budget 2005/2006)

NPA Customers (99,5% of revenue)

Port of Richards Bay , Port of Durban, Port of East London, Port of Port Elizabeth, Port of Mossel Bay, Port of Cape Town

Others (0,5% of revenue)

Dredging Services is responsible for executing dredging in the various ports, as per each of the port engineers requirements. In doing so the entrances of the various ports remain at a prescribed depth to allow certain vessels to enter and leave the ports. In addition the various beaches are nourished (in Durban and Richards Bay) by pumping dredged sand to municipality hopper stations that pump this sand onto the beaches.

Critical Challenges

The critical challenges facing DS is on the balance side of the critical opportunities existing for DS.

DS most critical opportunity is to maintain and grow the internal end external market it services and can serve. In order to achieve this goal the following resource challenges must be mitigated:

- Equipment:
    - Ageing Fleet. The development of an Asset replacement plan is of critical importance. (The average fleet age is in excess of the design life of a dredger which is between 20-25 years)
    - Implementing an adequate maintenance strategy
    - Improved utilisation

- Human Resources:
    - Skills depletion
    - Acceptance of a 24 hour working business model

The DS business unit has a vision of marketing itself as a global dredging specialist with flexibility to provide expert dredging solutions. The strategic initiatives and action plans as set out in this Business Plan are the stepping stones for this vision to be achieved.

New leadership and a new strategy

Up until 31 March 2000, Dredging Services was required, by the NPA to work on a break-even principle between total expenditure and revenue. Following agreement with NPA Senior Management, a net profit equal to the normal depreciation on fully depreciated dredgers may be realised.

This situation could not continue if Dredging Services is to become profitable and financially viable. The external revenue source used by the ports to fund maintenance dredging is port dues. The rate that Dredging currently charges the Ports needs to be revised in order to make allowance for major capital replacement (refer below Table 1.2 Financial Performance of DS 10 years), where it can be seen that only minor works capital expenditure has been used. R0.251m in 96/97 to R1.6m in 05/06). In September 2002, the previous Fleet Manager (Mr Pravesh Mannar), was promoted to Senior Manager Dredging Services with the task of attempting to create spare capacity with the existing Fleet in order to make DS profitable. What has hampered this initiative is the frequency of accidents and equipment breakdown that DS has encountered from 2002 - 2006. These include four main engine failures, three vessel groundings, two collisions (one of which was when a Russian container ship collided into the Dredger Ingwenya in Namibia. This resulted in the Dredger being unavailable for four months), As a result of this DS has only had capacity to focus on the South African ports system dredging requirements. Indeed, the NPA has had to supplement this capacity with external

Dredgers on hire, at great cost. Because the Dredgers are passed their design life, equipment obsolescence has been a major problem, especially on the electrical component side, where the original equipment manufacturer (Siemens) has closed down its plant in Germany that used to manufacture these components.

Current Situation

Product Offering of Dredging Services

Table 4.1 below illustrates the services offered by Dredging, the benefits and the users of the services.

Dredging	**Benefits**	**Users**
• Side trail, bow pipe, grab dredging and bed levelling • Beach nourishment	• Maintain promulgated port depth • Maintenance of beaches (littoral drift impact)	• Harbour Masters/Port Engineers • City Council • Ports
Hydrographic survey	**Benefits**	**Users**
• Provide depth profiles of ports	• Identification of dredge requirements at ports	• Ports/Port Engineer

Table 1.1: Dredging Services, Service Offering (Source: DS Business Plan 2004/2005)

	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm	Rm
Income	47.069	42.603	44.347	44.187	53.325	66.249	73.338	77.562	72.907	63.479
External	0.283	0.589	0.020	0.363	0.010	0.000	1.360	2.529	4.423	19.683
Intra Port Recoveries	46.884	41.826	44.290	43.623	53.190	66.088	71.600	74.586	66.826	42.633
NPA Cost Centre Recoverie	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Miscellaneous	(0.098)	0.188	0.037	0.201	0.125	0.161	0.378	0.447	1.658	1.163
Expenditure	45.059	41.678	46.562	49.646	59.277	60.331	59.459	64.036	67.317	97.881
Labour	15.119	16.159	17.551	18.469	21.609	26.695	27.748	30.546	32.790	33.524
Energy	3.873	3.267	4.095	3.935	5.084	7.720	7.704	7.607	8.978	9.041
Material	0.298	0.189	0.128	0.239	0.284	0.448	0.698	1.665	0.566	0.427
Depreciation	6.905	6.541	6.325	6.478	10.850	3.944	4.268	2.696	1.869	10.107
Other	18.864	15.522	18.463	20.525	21.450	21.524	19.041	21.521	23.114	44.781
NPA Cost Centre Charges	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating Surplus / Deficit	2.010	0.925	(2.215)	(5.459)	(5.952)	5.918	13.879	13.526	5.589	(34.402)
	4.3%	2.2%	-5.0%	-12.4%	-11.2%	8.9%	18.9%	17.4%	7.7%	-54.2%
Non operating expenditure	0.931	0.422	0.000	0.000	2.543	0.000	0.000	2.864	2.651	0.000
Net Surplus/Deficit	1.079	0.503	(2.215)	(5.459)	(8.495)	5.918	13.879	10.662	2.938	(34.402)
Capital Investment	0.251	0.126	0.215	4.385	1.061	0.500	0.500	0.540	0.913	1.600
Capital Investment (Cumula	69.880	66.577	64.730	66.746	426.278	426.778	427.278	427.818	428.731	430.331
Income		-9.49%	4.09%	-0.36%	20.68%	24.24%	10.70%	5.76%	-6.00%	-12.93%
External Turnover Increase		108.13%	-96.60%	1715.00%	-97.25%	-100.00%	#DIV/0!	85.96%	74.89%	345.02%
Internal Revenue Increase		-10.79%	5.89%	-1.51%	21.93%	24.25%	8.34%	4.17%	-10.40%	-36.20%
Miscellaneous Income Increase		-291.84%	-80.32%	443.24%	-37.81%	28.80%	134.78%	18.22%	271.03%	-29.85%
Expenditure		-7.50%	11.72%	6.62%	19.40%	1.78%	-1.45%	7.70%	5.12%	45.40%
Labour Increase		6.88%	8.61%	5.23%	17.00%	23.54%	3.94%	10.08%	7.35%	2.24%
Energy		-15.65%	25.34%	-3.91%	29.20%	51.85%	-0.21%	-1.26%	18.02%	0.70%
Material		-36.58%	-32.28%	86.72%	18.83%	57.75%	55.80%	138.57%	-65.99%	-24.55%
Depreciation		-5.27%	-3.30%	2.42%	67.49%	-63.65%	8.22%	-36.83%	-30.68%	440.79%
Other Ops Cost		-17.72%	18.95%	11.17%	4.51%	0.34%	-11.54%	13.03%	7.40%	93.74%
Operating Surplus / Deficit		-54%	-339%	146%	9%	-199%	135%	-3%	-59%	-715%

Table 1.2: FINANCIAL PERFORMANCE OF Dredging Services (past 10 years)
Source: DS Business Plan (2005/2006)

Company operations

Since its inception, DS head office was based in Durban, with two other project offices (in Richards Bay and East London).

The need for dredging arises from

- the littoral drift (the northward movement of sand along the east coast of Africa, through wave action)
- natural movement of material ; the transfer of silt from rivers into the harbour.

- unnatural movement; from ship movement within the harbour.

The harbours have channels, basins, berths and a sandtrap.
The sandtrap is located near the entrance of all the ports (just before the southern breakwater), and is dredged so that a hole (sand trap) is created, which traps the sand that would otherwise have moved into the Port entrance channel, making the channel shallower. This would have the effect of restricting/preventing certain types (and sizes) of vessels entering the Port at great cost to the NPA.
The berths are also important as they facilitate ship docking. The berths have a designed depth, which need to be maintained. If the berths are shallower that what they are designed for, then ships would run aground when alongside. If the berths get too deep the quay walls would collapse since the construction of these quays is dependant on it maintaining that designed depth.

In basic terms DS provides and maintains a port depth. This is not as simple as it sounds as berths are exposed to siltation, and, the movement of ships and tugs facilitate the uneven spread of siltation. This has the effect of creating high spots and low spots. The danger with high spots is that it could result in a ship going aground (its hull resting on the sea bed thereby limiting mobility). With this charts provided to the dredgers they are able to remove these low spots. Alternatively, a berth could be deeper than its design. That is also dangerous since its design only allows a limited depth, after which the berth would collapse. So, it is evident that by either deepening or making a berth shallower, the dredgers maintain a depth.
Hydro carries out surveys before, during and after completion of dredging. These surveys assist the dredgers by providing an element of control and feedback to the Dredging operations. These surveys are also important to the customers, as proof that the dredging is at promulgated depth.

Project Offices

The project offices in Durban and Richards Bay carry out the above mentioned services at these ports respectively. The East London office is responsible for Port Elizabeth, Mossel Bay and their local port.

Training

Due to the previous work methods of having personnel restricted to certain crafts and in certain ports, training was never easily facilitated (as highlighted by the HR manager during EXCO meetings). With the move to pool resources before April 2004, all the personnel will reside in the operations cost center. This is advantageous in that the marine personnel will be allowed to live anywhere in South Africa, without having a home port or specific vessel. They would be required to work at any project at any time. There would also be greater utilization of personnel, and training would be more easily accommodated. The crew report to the Captain/Master of the vessel, who now reported to a Crewing Manager, who decides who operates on which craft and schedules their training as well. Previously the HR manager used to schedule training but this was ineffective as the Project Managers would not be willing to release individuals as they were 'pushing production'. Also multiskilling would take place and the personnel would gain knowledge of the various dredgers which operate differently.

Strategic Objectives (as per DS Business Plan 2005/2006)

- Value and wealth creation;
- Optimizing infrastructure and business processes to enhance logistics chains timeously;
- Create winning customers and stakeholders through service excellence;
- Inculcate behaviour embracing NPA core values.
- Develop people's business skills and embed innovation as a core competence

Core Values (as per DS Business Plan 2005/2006)

- Open and honest communication
- Service excellence
- Employee development
- Safe and secure environment
- Human dignity and respect
- Legislative and regulatory compliance
- The well being of communities in which we operate
- Integrity in our business conduct
- Employee participation and empowerment
- Cultural diversity and inclusiveness
- The recognition of good performance and behaviour

Growth potential

As can be seen from the Income Statement above (Table 1.2), the profitability of the organisation is sub-par. Operating surplus of the organisation has been on the decline, with the largest loss experienced in the 2005/2006 financial year.

Also important to note is the minimal Capital expenditure which has been a long term trend for DS and is directly responsible for the current asset base being so unreliable.

External income did increase in the 2005/2006 financial year, but even this is below what is required to sustain the high depreciation costs if a new Dredger (approximately R500 million for a 4000m^3 trail suction hopper dredger) is bought. According to the DS marketing plan 2006, the drive has to be toward marketing Dredging in Africa and successfully tendering on 'external to NPA' contracts.

With efficient working methods and greater utilization, even more is expected of DS. Working solely as an internal contractor to the ports system is no longer adequate, as the CEO expects DS to justify its existence to the NPA, and likewise, hydro to DS. The

emphasis is now on obtaining external revenue and servicing the local ports with the same resources.

Main competitors

DS has no competitors based locally. However there are many International Dredging companies, with the majority residing in Holland (e.g. Vosta Lmg, Van Oord). They are equipped with 'Jumbo' dredgers which are Trail Suction Hopper Dredgers with hopper capacities that could fit one of our entire dredgers. What this means is that if they are able to secure work in sub Saharan Africa, their exorbitant deployment costs can be foregone and they are then able to price competitively with DS dredging rates.
Dredging Services tendering for work gets more difficult, the further north along the African coasts as get DS deployment costs increase and those of foreign competitors decrease.
Relating to Hydrographic survey, local and international competitors exist e.g. Water Affairs, who have their own Hydro department and Subtech diving who have their own hydro equipment.

INDUSTRY TRENDS

The dredging industry requires intensive capital investment and has a high dependency on technology. Relating to equipment, a significant modern trend in the dredging world has been the construction of 'jumbo' dredgers; which are geared toward large volume, capital work. There has also been a recent trend for some of the bigger European companies to take an interest in African dredging, because of the intense international competition, as evidenced by these companies directly approaching DS to form memorandums of understanding as well as tender for work in Walvis Bay and Maputo, in competition with DS. Their aim is to acquire one contract and then aggressively market themselves towards acquiring further work based on their exorbitant deployment costs already being covered by the initial contract.

MARKET SIZE

There is a considerable market in the global arena for dredging and hydrographic survey (DS Marketing Plan 2005/2006). The European market for dredging is characterised by intense competition by a few well-established companies. Africa though, is an untapped market as far as African representation is concerned. In Africa, especially sub-Saharan Africa, Dredging Services is one of the very few dredging companies that have the potential to do dredging in foreign countries. This represents a significant market size and it is the intention to show that this is the only alternative to keeping Dredging Services sustainable.

Hydrographic survey is independent of dredging. There are many hydro survey companies around the world, with the Dutch at the forefront e.g. the largest commercial contractor being the Netherlands based FUGRO (according to a report "Ocean Survey-The World Market", Internet source 3, www.hydrogpahicsociety.org/pdf/jornal-111-Article3.pdf). This report also concluded that "the world hydrographic survey market will continue its long-term growth trend from some $2.5 billion in 2004 to $2.8 billion in 2008, with Western Europe and North America being the largest markets. The value of the business addressable by the commercial survey contractors should also continue to grow, from $536 million in 2004 to $680 million in 2008." Africa has an abundant supply of lakes, commercial rivers, ports and dams, with the demand outweighing the supply. The foreign companies may have an advantage of being first movers in the European market, but DS would enter the African market with the reputation of being an African representative that has monopolized the South African market. That coupled with the costing in Rands should provide Dredging Services considerable advantage for market entry.

Dredging Services competitive advantage in Sub-Saharan Africa is that, even with a smaller fleet (and smaller capacity vessels), the cost to complete the entire work is of the order of the bigger International companies cost of mobilising i.e. the costs just to get to Africa and de-mobilising to return. (They would still need to add the price of Dredging

once at the location). This is based on comparison of actual rates received by DS from foreign Dredging companies e.g. Rohder Nielson, Denmark and van Oord, Holland. The threat to this is that if they are successful in a tender at an African Country they can then attempt to secure additional work in the region without charging for the exorbitant mobilisation costs, and thus being able to compete with Dredging Services.

1.2 PROBLEM STATEMENT AND OBJECTIVES

DS has traditionally had work scheduled for the year, by the various South African ports requiring dredging. This work was distributed throughout the year with an apparent unavailability of spare capacity for 'outside work'. Indeed lucrative work has been passed up because of previous management's reluctance to change from the normal operating pattern.

Another legacy issue is that there has been no capital improvement program/asset replacement plan in existence for Dredging Services. A result of this is an ageing Dredging fleet with sub par equipment availability and productivity through breakdowns and equipment obsolescence.

As a result of the above, the problem for DS is to establish how it can change its current mode of operation in order to create capacity for additional work that is required for it to become sustainable. The problem is twofold and relates to capacity and equipment.

The objectives that, if fulfilled, will provide a solution to the problem are;

- To develop a business plan which will enable DS to 'create' capacity to allow for external work to be accomplished, thereby facilitating business sustainability.
- To develop an asset replacement plan which is required to support the external work initiatives of the business

These are two real business issues which if answered will be of immense benefit to the organisation.

1.3 RESEARCH DESIGN AND METHODOLOGY

This research takes the form of a case study format, with the data collected being analysed to identify the future strategy.

1.3.1 PRESENTATION OF A CASE STUDY

As the study is of a qualitative, rather than quantitative nature, the approach to the dissertation is one of a case study of Dredging Services; NPA's internal dredging company. The first section of the dissertation will be the case study itself comprising a strategic analysis. In addition, internal financial documents, marketing plans and strategic planning documents of the company will be used to evaluate the position of the company and also to identify patterns that may assist in determining future strategies. A detailed repositioning plan and Asset Replacement plan will also be developed.

1.3.2 DATA COLLECTION METHODS AND ANALYSIS

Secondary data is to be collated and researched, the sources of which are dredging and hydrographic survey journals, strategy books and relevant web sites. In addition interviews will be held with current executive committee members of Dredging Services.

1.3.3 DATA ANALYSIS TO IDENTIFY FUTURE STRATEGY

Studies, research papers, journals and DS business plans will be reviewed in the context of strategy research. Strategic research will be conducted in the following subject areas:
The competitive forces within the market
External forces affecting the market
Global Dredging trends
Business plan mapping future

1.4 STRUCTURE OF THE STUDY

The chapters are presented as follows:

CHAPTER 1: INTRODUCTION

In Chapter1, the DS case is presented together with the problem statement, objectives and structure of the study.

CHAPTER 2: LITERATURE REVIEW

In Chapter 2, various strategic theories and tools that are, applicable to DS and will aid in providing DS with a way to become sustainable, will be discussed to develop a model for the business plan to be developed.

CHAPTER 3: RESEARCH METDOLOGY

In Chapter 3, the case study methodology will be discussed.

CHAPTER 4: PRESENTATION OF RESULTS

In Chapter 4, using the model constructed in Chapter 2, a business plan for Dredging Services will be developed, detailing how the business must reposition itself to become a profitable, viable entity. An Asset Replacement plan will also be developed.

CHAPTER 5: DEVELOPMENT OF AN ASSET REPLACEMENT PLAN

In Chapter 5 an asset replacement plan will be developed for DS.

CHAPTER 6: DISCUSSION OF RESULTS AND CONCLUSION

Chapter 6 will contain the recommendations and the way forward to tackle the strategic direction, with associated timelines.

1.5 IMPORTANCE OF THE PROPOSED STUDY

The dissertation is of benefit to Dredging Services as it will provide a detailed plan to present to the NPA as mandated to do (as per NPA Corporate Business Plan 2005/2006 v3). In essence, this study serves to provide Dredging Services with a clear plan of how it requires to be repositioned in order to be self-sustainable into the future and the timelines associated with it, as mandated by the NPA. An asset replacement plan is also developed to include in the plan, as the current Fleet are rapidly approaching the end of their design life. In a competitive, highly technical industry this therefore represents the greatest threat to the business in terms of its competitiveness sustainability. This dissertation will add to the "body of knowledge" as there is no previous research available on other Dredging providers.

1.6 NATURE AND FORM OF RESULTS

The dissertation will be presented in a book form using the Harvard method of referencing. The study will document the strategies that have been identified for the researcher in designing the business plan. The conclusion will reveal the chosen route the researcher will recommend to allow the business to be sustainable.

1.7 SUMMARY

NPA, as per its corporate business plan (2005/2006), has mandated that DS (a business unit within NPA), justify its existence to the NPA, source external revenue and grow into an international business. If DS cannot justify its existence then the only alternatives are to outsource the dredging of the South African ports to an external contractor and/or build sand bypass (underwater fixed pumps) systems. The starting point would therefore be a business and repositioning plan for Dredging Services, in keeping with the strategic direction of the National Ports Authority of South Africa, with associated timelines to grow Dredging as a business both locally and internationally. In addition an Asset Replacement Strategy will be developed and implemented.

CHAPTER 2: LITERATURE REVIEW

In this Chapter, relevant theories and strategic tools will be selected and discussed to develop a model for the business plan to be developed.

In order to develop a business plan, an understanding of what strategy is and what it encompasses is discussed.

Figure 2.1 An integrated model of strategy (Raina:2006)

Raina:2006 provides the following integrated model of Strategy illustrated in Figure 2.1. This framework provides the attributes of a good strategy for DS as elaborated upon below.;

For DS the vision is to become sustainable by creating capacity for external work which would deliver external income. All goals should then support this vision.

The environmental factors are extremely relevant as there is the threat of Transnet outsourcing its Dredging requirement to foreign companies. The opportunity for DS is that it can enter the Sub Saharan Africa dredging market at a competitive price because of its proximity to this market. The only other Dredging companies capable of performing dredging in South Africa are located in Europe and as such have exorbitant mobilization (deployment) and demobilization costs.

A limiting factor is the prevailing "Enterprise culture" at DS which is geared toward performing internal dredging work for Transnet and different to what is required in order to become an external contractor. An illustration of this is the harsh penalties that an external contractor has to pay if the project is late as opposed to within Transnet, where not finishing work in time can be tolerated.

2.1 The Strategic Planning Process

(According to Bradford et al) Modern organisations utilise a strategic planning process (as highlighted in Figure 2.2 below) to define objectives and assess both the internal and external situation to formulate a strategy. This is then implemented, evaluated and modified to be able to fulfil the organisations long term goals.

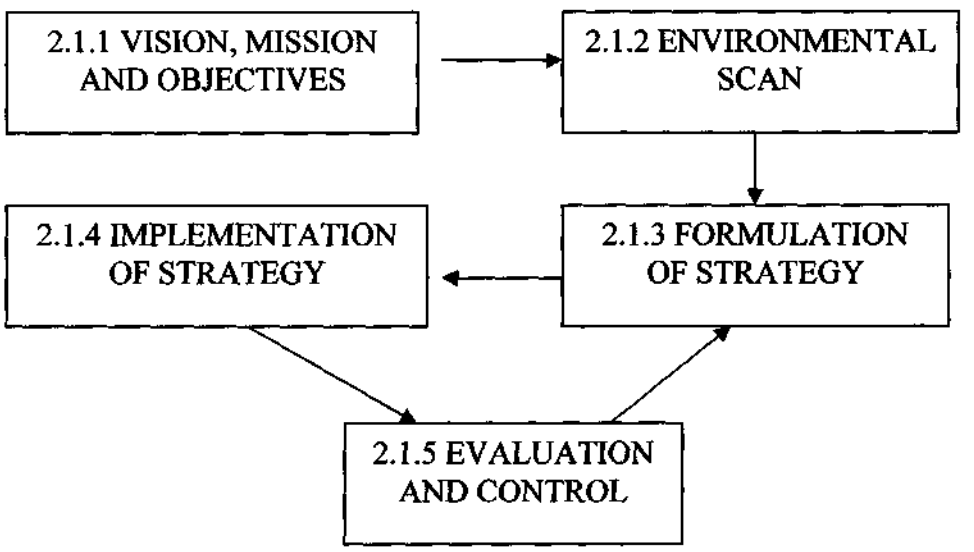


Figure 2.2 Strategic Planning Process Source: ***(Bradford et al)***

The elements incorporated in Figure 2.2 are discussed in more detail below;

2.1.1 Vision Mission and Objectives

A mission statement describes a company's business vision, including the unchanging values and purpose of the firm and forward-looking visionary goals that guide the pursuit of future opportunities. Guided by the business vision, the firm's management/leaders can

define measurable financial and strategic objectives. Financial objectives involve measures such as sales targets and earnings growth. Strategic objectives are related to the firm's business position, and may include measures such as market share and reputation.

2.1.2 Environmental Scan

This comprises the following areas:

- SWOT Analysis;

The Internal analysis of the firm, which identifies the organisations strengths and weaknesses.

The External analysis, which reveals opportunities and threats.

The SWOT analysis will reveal if DS can use its internal strengths to exploit available opportunities and mitigate the effect those weaknesses that make the organisation vulnerable to outside threats.

- Industry Analysis;

Utilising Michael Porter's 'five forces' framework. (Hitt *et al*, page 57)

- External macro environment analysis; PESTLE analysis (Hitt *et al*, page 41)

2.1.3 Strategy Formulation

The information from the environmental scan, as mentioned above, can be used by the organisation to match its strengths to the opportunities that it has identified, while addressing its weaknesses and external threats.

DS needs to identify its competitive advantage whether based on cost or product differentiation. Once this is established it can be used to obtain an advantage over industry rivals thereby attaining above average profitability.

Michael Porter identified three industry-independent generic strategies from which DS can choose.

Strategic choice then follows and involves understanding the nature of stakeholder expectations, identifying strategic options, and then evaluating and selecting strategic options.

2.1.4 Strategy Implementation

The strategy that is selected is implemented by means of programs, budgets, and procedures. Implementation involves organization and optimum utilisation of the firm's resources, and motivation of the staff to achieve objectives. Strategy implementation has a significant impact on whether the strategy will be successful. Communication of the strategy to all is vitally important as the implementation is likely to be done by those not directly involved with its formulation. Effective communication can also achieve buy-in and lower resistance (which normally rears as a result of change) to its adoption. It has been vocalised by the Transnet Chief Executive (Ms Maria Ramos) at the 2006 Durban "Imbiso" that Transnet has a reputation for being very proficient at developing plans and strategies but is weak in implementation of these plans.

2.1.5 Evaluation & Control

Monitoring of the effects of the Strategy and its implementation is done so as to allow the necessary adjustments that will be needed to maintain focus.

Evaluation and control consists of the following steps:
- Define parameters to be measured
- Define target values for those parameters
- Perform measurements
- Compare measured results to the pre-defined standard
- Make necessary changes.

This is the basis followed for any control process i.e. the use of a homeostat philosophy. (A homeostat is a closed system comprising of an input being transformed into an output by a process. Control of this process is achieved by a feedback loop.)

Having a system such as this will provide a mechanism that will allow DS to be able to improve its processes.

2.2 The Business Vision and Company Mission Statement

According to Bradford *et al*, organisations require a vision of how they will change and improve in the future. The vision of the business gives it purpose and provides a basis and guide to decision making and strategic direction.

While a business must continually adapt to its competitive environment, there are certain core ideals that remain relatively steady and provide guidance in the process of strategic decision-making. These unchanging ideals form the **business vision** and are expressed in the company **mission statement**.

(Collins and Porras, 1996: pages 65-77) provided a framework for understanding business vision and articulating it in a mission statement.
The mission statement communicates the firm's core ideology and visionary goals, generally consisting of the following three components:

- **Core values** to which the firm is committed. Core values reflect the deeply held values of the organization and are independent of the current industry environment and management fads.
- **Core purpose** of the firm. The core purpose is the reason that the firm exists. This core purpose is expressed in the mission statement.
- **Visionary goals** the firm will pursue to fulfill its mission. The visionary goals are the lofty objectives that the firm's management decides to pursue. In contrast to the core ideology that the firm discovers, visionary goals are selected. Visionary goals are longer term and more challenging than strategic or tactical goals.

The firm's core values and purpose constitute its core ideology and remain relatively constant. They are independent of industry structure and the product life cycle. The core ideology is not created in a mission statement; rather, the mission statement is simply an

expression of what already exists. The specific phrasing of the ideology may change with the times, but the underlying ideology remains constant.

Mission

A strategic plan starts with a clearly defined business vision i.e. knowing where the organisation currently exists and where it would like to be. The mission then is how to achieve the vision.

Mintzberg *et al*, 1990 defines a mission as follows;

"A mission describes the organisation's basic function in society, in terms of the products and services it produces for its customers",

2.3 Strategy across the business hierarchy

According to Porter: 1987, p43-59, strategy can be formulated on three different levels:

- corporate level
- business unit level
- departmental level.

2.3.1 Corporate Level Strategy

Porter explains that the corporate level strategy is concerned with two key questions, what businesses the firm should be in and how the corporate office should manage the group of businesses. Corporate level strategy acts to guide strategic decision-making throughout the business and is concerned with the overall purpose and scope of the business to meet stakeholder expectations.

From a Transnet perspective the current management team have created a 4-point turnaround strategy (listed Chapter 4) to align the whole organisation. This can be viewed as a corporate level strategy that informs the NPA strategy (business unit level) which

determines DS strategy (departmental level). The only difference is that DS is not merely a department within the NPA but actually a separate business unit (just as a port is),

One of the 4-point Transnet strategy relates to re-structuring of the balance sheet of Transnet with the aim of removing non-core businesses and assets. This will provide the capital to proceed with infrastructure development.

Thus strictly speaking, DS as a support activity to the ports can, in principle be considered non-core and thus outsourced. The reason this has not been done yet is the risk attached to failure of meeting the Ports dredging requirements. This is listed as one of Transnet's greatest risk exposures because the impact of Port restrictions and/or Port closure has an impact on South Africa's economy.

2.3.2 Business Unit Level Strategy

According to Porter: 1980, business-level strategies are intended to create differences between the firm's position relative to those of its rivals;

- It concerns strategic decisions about product choice, satisfying needs of customers, gaining competitor advantage and exploiting or creating new opportunities etc.
- The strategic issues are less about the coordination of operating units and more about developing and sustaining a competitive advantage for the goods and services that are produced.
- Strategy formulation phase deals with:
    - positioning the business against rivals
    - the possibilities of vertical, forward or backward integration
    - adjusting the strategy to accommodate changes in market trends

Michael Porter provides three generic strategies (*cost leadership*, *differentiation*, and *focus*) that can be implemented at the business unit level to create a competitive advantage and defend against the adverse effects of the five forces.

From a DS perspective the generic strategy of cost leadership is relevant. This is because no other dredging company can compete with DS for the Sub-Saharan market based on cost, under their present operating patterns. As explained before this has to do with geographical location and the exorbitant costs for external companies to deploy their dredgers. Another cost factor is that external dredging companies have larger hopper dredgers which require a bigger volume of work to keep them viable. They are thus geared more toward Capital dredging ("new works") as opposed to Maintenance dredging ("to maintain an existing depth")

2.3.3 Departmental/Operational Level Strategy

This is the level of the operating divisions and departments and is primarily concerned with how each part of the business is organised to deliver the corporate and business-unit level strategic direction.

- The focus is on issues of resources and processes.
- The strategic issues are related to business processes and the value chain.
- Functional level strategies in marketing, finance, operations, human resources, and R&D involve the development and coordination of resources through which business unit level strategies can be executed efficiently and effectively.
- Functional units of an organization are involved in higher level strategies by providing input into the business unit level and corporate level strategy, such as providing information on resources and capabilities on which the higher level strategies can be based. Once the higher-level strategy is developed, the functional units translate it into action-plans that each department or division must accomplish for the strategy to be successful.

Strategy being formulated on these different levels (Corporate, Business and Departmental levels) is relevant to Dredging Services. The Corporate strategy is formulated by Transnet, which provides the focus for developing the Business strategy of the National Ports Authority. This in turn sets the boundaries in which the operational strategies of Dredging Services are established.

2.4 The Business Plan

A business plan details the business that is being formed and details how it will become profitable. It usually begins with a statement outlining the purpose and goals of the business and goes on to show how the business owner will realize those goals. A complete business plan also contains a formal profit-and-loss projection designed to show that if the business develops as expected, it will make money.

This will be developed for DS under the new scenario of acquiring external work.

A business plan serves three functions. First, it is a plan that can be used to develop ideas about how the business should be conducted. Second, it is a retrospective tool, against which the company's actual performance over time can be assessed. Lastly, it is used to raise money (Siegel *et al*, 1993).

2.5 Strategic tools

These are used to analyse a business, both internally and externally.

2.5.1 PESTLE Analysis

According to Johnson and Scholes, 2002, PESTLE analysis aims to identify and summarise environmental influences on an organisation or policy.

PEST analysis involves identifying the political, economic, socio-cultural and technological influences on an organisation - providing a way of auditing the

environmental influences that have impacted on an organisation or policy in the past and how they might do so in future.

Increasingly when carrying out analysis of environmental or external influences, legal factors have been separated out from political factors (due to increasing legal influences outside national political systems, such as European and regional legislation). The increasing acknowledgement of the significance of environmental factors has also led to Environment becoming a further general category, hence 'PESTLE analysis' becoming an increasingly used and recognised term, replacing the traditional 'PEST analysis':

P – political, E - economic, S - socio-cultural,
T – technological, L – legal, E - environmental

Figure 2.4 PESTLE Analysis (Source: Johnson and Scholes 2002)

According to Johnson and Scholes:2002, the following can be used as a checklist to consider and prompt analysis of the different influences. The model can then be used to inform and guide further analysis.

1. Which of the environmental factors are affecting the organisation?
2. Which of these are the most important at the present time? In the next few years?

Political	Economic
• Taxation policy • Local government /devolved administrations • employment laws • environmental regulations • trade restrictions and tariffs • political stability	• Business cycles • GNP trends • Interest rates • Inflation • Unemployment • Disposable income • economic growth • exchange rates
Socio-cultural	Technological
• Population demographics • Income distribution	• New discoveries • ICT developments

• Social mobility • Lifestyle changes • Attitudes to work and leisure • Consumerism • Levels of education • Health consciousness	• Speed of technology transfer • Rates of obsolescence • R&D activity • Automation • Rate of technological change
Legal • International/European Agreement/Law • Employment Law • Competition Law • Health & Safety Law • Regional legislation	Environmental • Environmental impact • Environmental legislation • Energy consumption • Waste disposal

The items in the list above are of limited value if they are merely seen as a listing of influences. It is therefore important that the implications of the factors are understood. It may be possible to identify a number of structural drivers of change, which are forces likely to affect the structure of an industry, sector or market. It will be the combined effect of some of these separate factors that will be important, rather than the factors separately. A good example can be found in the forces which are leading to increased globalisation of industries and markets.

It is particularly important that PEST(LE) is used to look at the future impact of external factors, which may be different from their past impact.

A PESTLE analysis would thus have value for DS to understand the environment in which it operates.

2.5.2 SWOT Analysis

SWOT is an abbreviation for **Strengths, Weaknesses, Opportunities and Threats**.

SWOT analysis is an important tool to be applied for Dredging Services and will be used for auditing the overall strategic position of a business and its environment. Once key strategic issues have been identified, they feed into business objectives, particularly marketing objectives. The SWOT analysis provides information that is helpful in matching the firm's resources and capabilities to the competitive environment in which it operates. As such, it is instrumental in strategy formulation and selection. The following shows how a SWOT analysis fits into an environmental scan:

Strengths

A firm's strengths are its resources and capabilities that can be used as a basis for developing a competitive advantage. Examples of such strengths include:

- patents
- strong brand names
- good reputation among customers
- cost advantages from proprietary know-how
- exclusive access to high grade natural resources
- favourable access to distribution networks

Weaknesses

The absence of certain strengths may be viewed as a weakness. For example, each of the following may be considered weaknesses:

- lack of patent protection
- a weak brand name
- poor reputation among customers
- high cost structure
- lack of access to the best natural resources
- lack of access to key distribution channels

Opportunities

The external environmental analysis may reveal certain new opportunities for profit and growth. Some examples of such opportunities include:

- an unfulfilled customer need
- arrival of new technologies
- loosening of regulations
- removal of international trade barriers

Threats

Changes in the external environmental also may present threats to the firm. Some examples of such threats include:

- shifts in consumer tastes away from the firm's products
- emergence of substitute products
- new regulations
- increased trade barriers

SWOT analysis identifies factors that may affect desired future outcomes of the organization. The SWOT model is based on identifying the organization's internal strengths and weaknesses, and threats and opportunities of the external environment, and consequentially identifying the company's distinctive competencies and key success factors. These, along with considerations of societal and company values, lead to creation, evaluation, and choice of strategy. SWOT's objective is to recommend strategies that ensure the best alignment between the external environment and internal situation (Andrews, 1980, Christensen et al., 1982 in Mintzberg, p. 36-37; Hax & Majluf, 1996, p.27; Hill & Jones, 1992, p. 14).

Adding and weighting criteria to each factor increases the validity of the analysis. Therefore, the weighted SWOT analysis (according to Ambroscini) is more feasible.

A firm should not necessarily pursue the more lucrative opportunities. Rather, it may have a better chance at developing a competitive advantage by identifying a fit between

the firm's strengths and upcoming opportunities. In some cases, the firm can overcome a weakness in order to prepare itself to pursue a compelling opportunity.
To develop strategies that take into account the SWOT profile, a matrix of these factors can be constructed. The SWOT matrix is shown below:

	Strengths	**Weaknesses**
Opportunities	S-O Strategies	W-O Strategies
Threats	S-T Strategies	W-T Strategies

Figure 2.5 SWOT analysis strategies

S-O strategies pursue opportunities that are a good fit to the company's strengths.
W-O strategies overcome weaknesses to pursue opportunities.
S-T strategies identify ways that the firm can use its strengths to reduce its vulnerability to external threats.
W-T strategies establish a defensive plan to prevent the firm's weaknesses from making it highly susceptible to external threats.

A SWOT analysis will be undertaken for DS in order to leverage strengths to exploit external opportunities and mitigate the exposure of weaknesses to perceived threats. A SWOT analysis strategy (as per Figure 2.5) will be selected.

2.5.3 Competitive Advantage

A competitive advantage is an advantage over competitors gained by offering consumers greater value, either by means of lower prices or by providing greater benefits and service that justifies higher prices.

Competitor analysis has several important roles in strategic planning:

• To help management understand their competitive advantages/disadvantages relative to competitors
• To generate understanding of competitors' past, present (and most importantly) future strategies
• To provide an informed basis to develop strategies to achieve competitive advantage in the future
• To help forecast the returns that may be made from future investments (e.g. how will competitors respond to a new product or pricing strategy?

When undertaking competitor analysis the following questions must be answered in order to develop an understanding of the competitive environment with the intention of understanding competitors to predict their competitive actions and responses (Adapted from Hitt *et al*, pg 153)

•Who are our competitors?
•What threats do they pose?
•What is the profile of our competitors?
•What are the objectives of our competitors?
•What strategies are our competitors pursuing and how successful are these strategies?
•What are the strengths and weaknesses of our competitors?
•How are our competitors likely to respond to any changes to the way we do business?

These questions will be answered for Dredging Services in Chapter 4, so that DS can establish its competitive advantage and analyse competitors in a structured manner.

2.5.4 Porter's Generic Strategies

If the primary determinant of a firm's profitability is the attractiveness of the industry in which it operates, an important secondary determinant is its position within that industry. Even though an industry may have below-average profitability, a firm that is optimally positioned can generate superior returns. A firm positions itself by leveraging its strengths. Michael Porter has argued that a firm's strengths ultimately fall into one of two headings: cost advantage and differentiation. By applying these strengths in either a broad or narrow scope, three generic strategies result: *cost leadership*, *differentiation*, and *focus*. These strategies are applied at the business unit level. They are called generic strategies because they are not firm or industry dependent. The following table illustrates Porter's generic strategies:

Industry Force	Generic Strategies		
	Cost Leadership	Differentiation	Focus
Entry Barriers	Ability to cut price in retaliation deters potential entrants.	Customer loyalty can discourage potential entrants.	Focusing develops core competencies that can act as an entry barrier.
Buyer Power	Ability to offer lower price to powerful buyers.	Large buyers have less power to negotiate because of few close alternatives.	Large buyers have less power to negotiate because of few alternatives.
Supplier Power	Better insulated from powerful suppliers.	Better able to pass on supplier price increases to customers.	Suppliers have power because of low volumes, but a differentiation-focused firm is better able to pass on supplier price increases.
Threat of Substitutes	Can use low price to defend against substitutes.	Customer's become attached to differentiating attributes, reducing threat of substitutes.	Specialized products & core competency protect against substitutes.
Rivalry	Better able to compete on price.	Brand loyalty to keep customers from rivals.	Rivals cannot meet differentiation-focused customer needs.

Figure 2.6 Porters Generic Strategies (Source: Porter:1979)

2.5.4.1 Cost Leadership Strategy

Referring to Figure 2.6 all the comments under the Cost Leadership strategy apply to DS, making this the most relevant strategy. This generic strategy focuses on being the low cost producer in an industry for a given level of quality. The firm sells its products either at average industry prices to earn a profit higher than that of rivals, or below the average industry prices to gain market share. In the event of a price war, the firm can maintain some profitability while the competition suffers losses. Even without a price war, as the industry matures and prices decline, the firms that can produce more cheaply will remain profitable for a longer period of time. The cost leadership strategy usually targets a broad market.

Some of the ways that firms acquire cost advantages are by improving process efficiencies, gaining unique access to a large source of lower cost materials, making optimal outsourcing and vertical integration decisions, or avoiding some costs altogether. As with the DS case the mobilisation and de-mobilisation costs that competitors charge can be avoided or significantky reduced thereby providing the basis for adopting this strategy. If competing firms are unable to lower their costs by a similar amount, the firm may be able to sustain a competitive advantage based on cost leadership.

Firms that succeed in cost leadership often have the following internal strengths:
-Access to the capital required making a significant investment in production assets; this investment represents a barrier to entry that many firms may not overcome.
-Skill in designing products for efficient manufacturing, for example, having a small component count to shorten the assembly process.
-High level of expertise in manufacturing process engineering.
-Efficient distribution channels.

Each generic strategy has its risks, including the low-cost strategy. For example, other firms may be able to lower their costs as well. As technology improves, the competition may be able to leapfrog the production capabilities, thus eliminating the competitive advantage. Additionally, several firms following a focus strategy and targeting various narrow markets may be able to achieve an even lower cost within their segments and as a group gain significant market share.

2.5.4.2 A combination of Generic Strategies

The generic strategies are not necessarily compatible with one another. If a firm attempts to achieve an advantage on all fronts, it may achieve no advantage at all. For example, if a firm differentiates itself by supplying very high quality products, it risks undermining that quality if it seeks to become a cost leader. Even if the quality did not suffer, the firm would risk projecting a confusing image. For this reason, Michael Porter argued that to be successful over the long-term, a firm must select only one of these three generic strategies. Otherwise, with more than one single generic strategy the firm will be "stuck in the middle" and will not achieve a competitive advantage. Porter argued that firms that are able to succeed at multiple strategies often do so by creating separate business units for each strategy. By separating the strategies into different units having different policies and even different cultures, a corporation is less likely to become "stuck in the middle." However, there exists a viewpoint that a single generic strategy is not always best because within the same product customers often seek multi-dimensional satisfactions such as a combination of quality, style, convenience, and price. There have been cases in which high quality producers faithfully followed a single strategy and then suffered greatly when another firm entered the market with a lower-quality product that better met the overall needs of customers

Cost and differentiation advantages are known as *positional advantages* since they describe the firm's position in the industry as a leader in either cost or differentiation. A

resource-based view emphasizes that a firm utilizes its resources and capabilities to create a competitive advantage that ultimately results in superior value creation. The following diagram combines the resource-based and positioning views to illustrate the concept of competitive advantage:

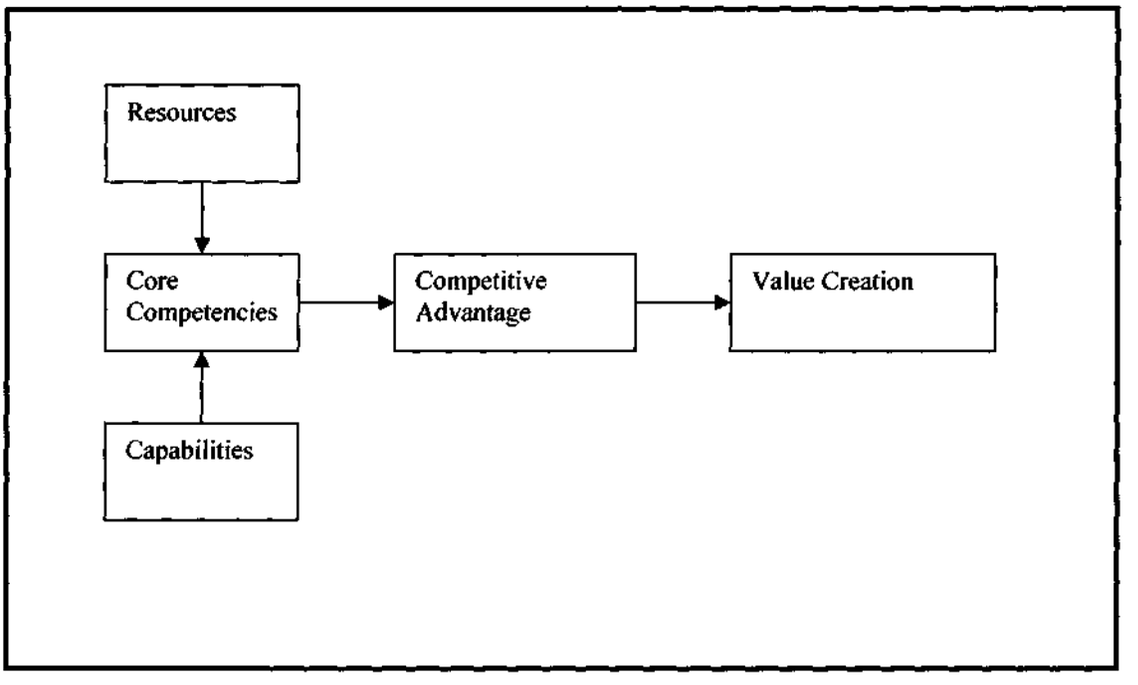


Figure 2.7 Illustration of the Competitive advantage concept (Source: Adapted from Hitt *et al*, page 89)

Resources and Capabilities and Core Competencies

Referring to Figure 2.7, (according to Hitt *et al*, pg 81), resources, capabilities, and core competencies are the characteristics that make up the foundation of competitive advantage and hence value creation. Resources are the source of firms capabilities. Capabilities are in turn the source of a firms core competencies which are the basis of competitive advantages. In order to develop a competitive advantage the firm must have resources and capabilities and core competencies that are superior to those of its

competitors. Without this superiority, the competitors simply could replicate what the firm was doing and any advantage quickly would disappear.

Resources alone do not yield a competitive advantage. In fact, a competitive advantage is created through the unique bundling of certain resources (according to Berman et al, 2002). According to Hitt et al, pg 83, resources can be tangible such as

- Financial resources -the firms borrowing capacity
- Physical Resources -sophistication and location of a firms plant and equipment.
  -Access to raw materials

or intangible such as

- Innovation Resources -ideas
  -capacity to innovate
- Reputational Resources -Brand name
  -Reputation with customers

Capabilities (according to Helfat and Raubitschek,2000) are the firms capacity to deploy resources that have been purposely integrated to achieve a desired end state. The glue binding an organisation together, capabilities emerge over time through complex interactions among tangible and intangible resources. An example of a capability is the ability to bring a product to market faster than competitors. Such capabilities are embedded in the routines of the organization and are not easily documented as procedures and thus are difficult for competitors to replicate.
The firm's resources and capabilities together form its **core competencies.** These competencies enable innovation, efficiency, quality, and customer responsiveness, all of which can be leveraged to create a cost advantage or a differentiation advantage.

Competitive advantage can be created by using resources and capabilities to achieve either a lower cost structure or a differentiated product. A firm positions itself in its industry through its choice of low cost or differentiation. This decision is a central component of the firm's competitive strategy.

Another important decision is how broad or narrow a market segment to target. Porter formed a matrix using cost advantage, differentiation advantage, and a broad or narrow focus to identify a set of generic strategies that the firm can pursue to create and sustain a competitive advantage.

Value Creation

The firm creates value by performing a series of activities that Porter identified as the value chain. In addition to the firm's own value-creating activities, the firm operates in a *value system* of vertical activities including those of upstream suppliers and downstream channel members. To achieve a competitive advantage, the firm must perform one or more value creating activities in a way that creates more overall value than do competitors. Superior value is created through lower costs or superior benefits to the consumer (differentiation).

Benchmarking is the process of identifying "**best practice**" in relation to both products (including) and the processes by which those products are created and delivered. The search for "best practice" can take place both inside a particular industry, and also in other industries (for example - are there lessons to be learned from other industries?). The objective of benchmarking is to **understand and evaluate the current position** of a business or organisation in relation to "best practice" and to identify areas and means of performance improvement.
These theories will be applied to the DS case in order to establish how best, "value" can be created for its customers.

2.5.5 Porter's Five Forces

According to Internet source 4, Michael Porter's 1979 framework uses concepts developed in Industrial Organization (IO) economics to derive **5 forces** that determine the attractiveness of a market. Porter referred to these forces as the microenvironment, to contrast it with the more general term macro-environment. They consist of those forces close to a company that affect its ability to serve its customers and make a profit. A change in any of the forces normally requires a company to re-assess the marketplace.

Four forces -- bargaining power of customers, the bargaining power of suppliers, the threat of new entrants, and the threat of substitute products -- combine with other variables to influence a fifth force, the level of competition in an industry. Each of these forces has several determinants:

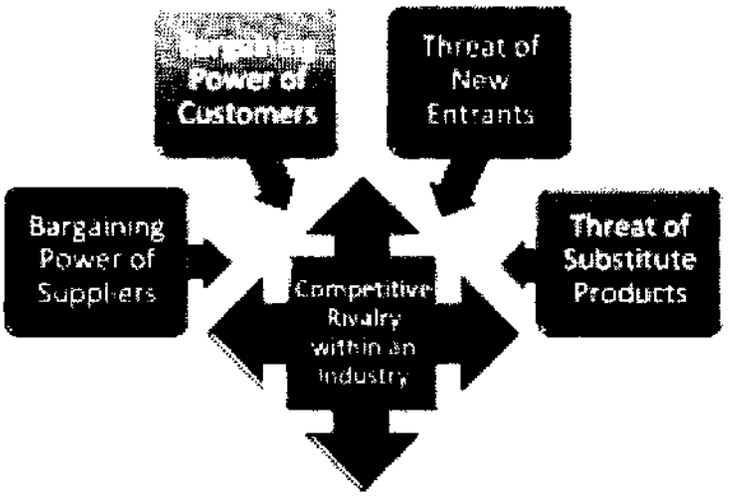


Figure 2.8 A graphical representation of Porters Five Forces (Source: http://en.wikipedia.org/wiki/Porter_5_forces_analysis))

The bargaining power of customers

- buyer concentration to firm concentration ratio
- bargaining leverage
- buyer volume
- buyer switching costs relative to firm switching costs
- buyer information availability
- ability to backward integrate
- availability of existing substitute products
- buyer price sensitivity
- price of total purchase

The bargaining power of suppliers

The cost of items bought from suppliers (e.g. components, raw materials) can have a significant impact on a company's profitability. If suppliers have high bargaining power over a company, then in theory the company's industry is less attractive. The bargaining power of suppliers will be high when:

- T here are many buyers and few dominant suppliers
- There are undifferentiated, highly valued products
- Suppliers threaten to integrate forward into the industry (e.g. brand manufacturers threatening to set up their own retail outlets)
- Buyers do not threaten to integrate backwards into supply
- The industry is not a key customer group to the suppliers

The degree of bargaining power of suppliers is dependant on;

- supplier switching costs relative to firm switching costs
- degree of differentiation of inputs
- presence of substitute inputs
- supplier concentration to firm concentration ratio
- threat of forward integration by suppliers relative to the threat of backward integration by firms
- cost of inputs relative to selling price of the product
- importance of volume to supplier

The threat of new entrants

New entrants to an industry can raise the level of competition, thereby reducing its attractiveness. The threat of new entrants largely depends on the barriers to entry. High entry barriers exist in some industries (e.g. Airline industry with huge infrastructure costs) compared to others which are not very difficult to enter (e.g. Estate Agencies). Key barriers to entry, according to Porter:1979 include;

-Economies of scale

-Capital / investment requirements

-Customer switching costs

-Access to industry distribution channels

- The likelihood of retaliation from existing industry players.

Key factors which impact on the threat of new entrants are;

- the existence of barriers to entry
- economies of product differences
- brand equity
- switching costs
- capital requirements
- access to distribution
- absolute cost advantages
- learning curve advantages
- expected retaliation
- government policies

The threat of substitute products

The presence of substitute products can lower industry attractiveness and profitability because they limit price levels. The threat of substitute products depends on:

- buyer propensity to substitute
- relative price performance of substitutes
- buyer switching costs
- perceived level of product differentiation

The intensity of competitive rivalry

The intensity of rivalry between competitors in an industry will depend on:

- number of competitors
- rate of industry growth
- intermittent industry overcapacity

- exit barriers - when barriers to leaving an industry are high (e.g. the cost of closing down factories), then rivalry is increased
- diversity of competitors
- informational complexity and asymmetry
- brand equity
- fixed cost allocation per value added
- level of advertising expense
- The structure of competition - for example, rivalry is more intense where there are many small or equally sized competitors; rivalry is less when an industry has a clear market leader
- The structure of industry costs - for example, industries with high fixed costs encourage competitors to fill unused capacity by price cutting
- Degree of differentiation - industries where products are commodities (e.g. coal) have greater rivalry; industries where competitors can differentiate their products have less rivalry
- Switching costs - rivalry is reduced where buyers have high switching costs
- Strategic objectives - when competitors are pursuing aggressive growth strategies, rivalry is more intense

In the traditional economic model, competition among rival firms drives profits to zero. But competition is not perfect and firms are not passive price takers. Rather, firms strive for a competitive advantage over their rivals.

The intensity of rivalry among firms varies across industries, and strategic analysts are interested in these differences. A high concentration ratio indicates that a high concentration of market share is held by the largest firms - the industry is concentrated. With only a few firms holding a large market share, the competitive landscape is less competitive (closer to a monopoly). A low concentration ratio indicates that the industry is characterized by many rivals, none of which has a significant market share. These fragmented markets are said to be competitive. The concentration ratio is not the only

available measure; the trend is to define industries in terms that convey more information than distribution of market share. If rivalry among firms in an industry is low, the industry is considered to be disciplined. This discipline may result from the industry's history of competition, the role of a leading firm, or informal compliance with a generally understood code of conduct. Explicit collusion generally is illegal and not an option; in low-rivalry industries competitive moves must be constrained informally. When a rival acts in a way that elicits a counter-response by other firms, rivalry intensifies. The intensity of rivalry commonly is referred to as being intense, moderate, or weak, based on the firms' aggressiveness in attempting to gain an advantage.

In pursuing an advantage over its rivals, a firm can choose from several competitive moves:

- Changing prices: Raising or lowering prices to gain a temporary advantage.
- Improving product differentiation: Improving features, implementing innovations in the manufacturing process and in the product itself.
- Creatively using channels of distribution: Using vertical integration or using a distribution channel that is novel to the industry.
- Maximising relationships with suppliers: e.g. Woolworths demanding exacting quality from its food suppliers to meet its demands for product differentiation by quality and price.

Though not supported by all, some argue that a 6th force should be added to Porter's list to include a variety of stakeholder groups from the task environment. This force is referred to as "Relative Power of Other Stakeholders". Some examples of these stakeholders are governments, local communities, creditors, and shareholders. such as employees, & so on. This 5 forces analysis is just one part of the complete Porter strategic models. The other elements are the value chain and the generic strategies.

One obvious application of Porters forces is to would-be entrants and the problem of entering new markets. Another is to the current competitors and the ongoing task of staying competitive in markets where they already operate.

Perhaps the most important thing to keep in mind is the relationship between profit margins or returns and the intensity of competition: as the intensity of competition goes up, margins and returns are driven down. This can require changes in competitive strategy to remain in an industry and, under some circumstances; it can trigger the decision to exit a business or an industry (Nickels, 2000).

Criticism

Porter's framework has repeatedly been challenged by other academics and strategists. Kevin Coyne and Somu Subramaniam (1996) have stated that three dubious assumptions underlie the five forces:

- That buyers, competitors, and suppliers are unrelated and do not interact and collude
- That the source of value is structural advantage (creating barriers to entry)
- That uncertainty is low, allowing participants in a market to plan for and respond to competitive behavior.

An important extension to Porter was found in the work of Brandenburger and Nalebuff in the mid-1990s. Using game theory, they added the concept of complementors (also called "the 6th force"), helping to explain the reasoning behind strategic alliances. According to most references, the sixth force is government or the public.

It is also perhaps not feasible to evaluate the attractiveness of an industry independent of the resources a firm brings to that industry.

2.5.6 Ansoff Matrix

This tool will be used to identify the strategy that DS should employ in order to grow.

According to this model, "strategy ... is designed to transform the firm from the present position to the position described by the objectives, subject to the

constraints of the capabilities and the potential" of the organization.(Source: Ansoff: 1957).

By considering ways to grow via existing products and new products, and in existing markets and new markets, there are four possible product-market combinations.

	Existing Products	**New Products**
Existing Markets	Market Penetration	Product Development
New Markets	Market Development	Diversification

Figure 2.9 Ansoff Matrix (Source: Ansoff: 1957)

The matrix provides for, four different growth strategies:

- **Market Penetration** - the firm seeks to achieve growth with existing products in their current market segments, aiming to increase its market share
- **Market Development** - the firm seeks growth by targeting its existing products to new market segments.
- **Product Development** - the firms develops new products targeted to its existing market segments.
- **Diversification** - the firm grows by diversifying into new businesses by developing new products for new markets.

Selecting a Product-Market Growth Strategy

The **market penetration** strategy is the least risky (according to http://en.wikipedia.org/wiki/Ansoff_matrix) since it leverages many of the firm's existing resources and capabilities. In a growing market, simply maintaining market share will result in growth, and there may exist opportunities to increase market share if competitors reach capacity limits. However, market penetration has limits, and once the market approaches saturation another strategy must be pursued if the firm is to continue to grow.

Market development options include the pursuit of additional market segments or geographical regions. The development of new markets for the product may be a good strategy if the firm's core competencies are related more to the specific product than to its experience with a specific market segment. Because the firm is expanding into a new market, a market development strategy typically has more risk than a market penetration strategy.

A **product development** strategy may be appropriate if the firm's strengths are related to its specific customers rather than to the specific product itself. In this situation, it can leverage its strengths by developing a new product targeted to its existing customers. Similar to the case of new market development, new product development carries more risk than simply attempting to increase market share.

Diversification is the most risky (according to http://en.wikipedia.org/wiki/Ansoff_matrix) of the four growth strategies since it requires both product and market development and may be outside the core competencies of the firm. In fact, this quadrant of the matrix has been referred to by some as the "suicide cell". However, diversification may be a reasonable choice if the high risk is compensated by the chance of a high rate of return. Other advantages of diversification include the potential to gain a foothold in an attractive industry and the reduction of overall business portfolio risk.

2.6 Model development

The output of the theoretical analysis is the compilation of a strategic analysis model to which the case can be applied. The model to be used is as follows;

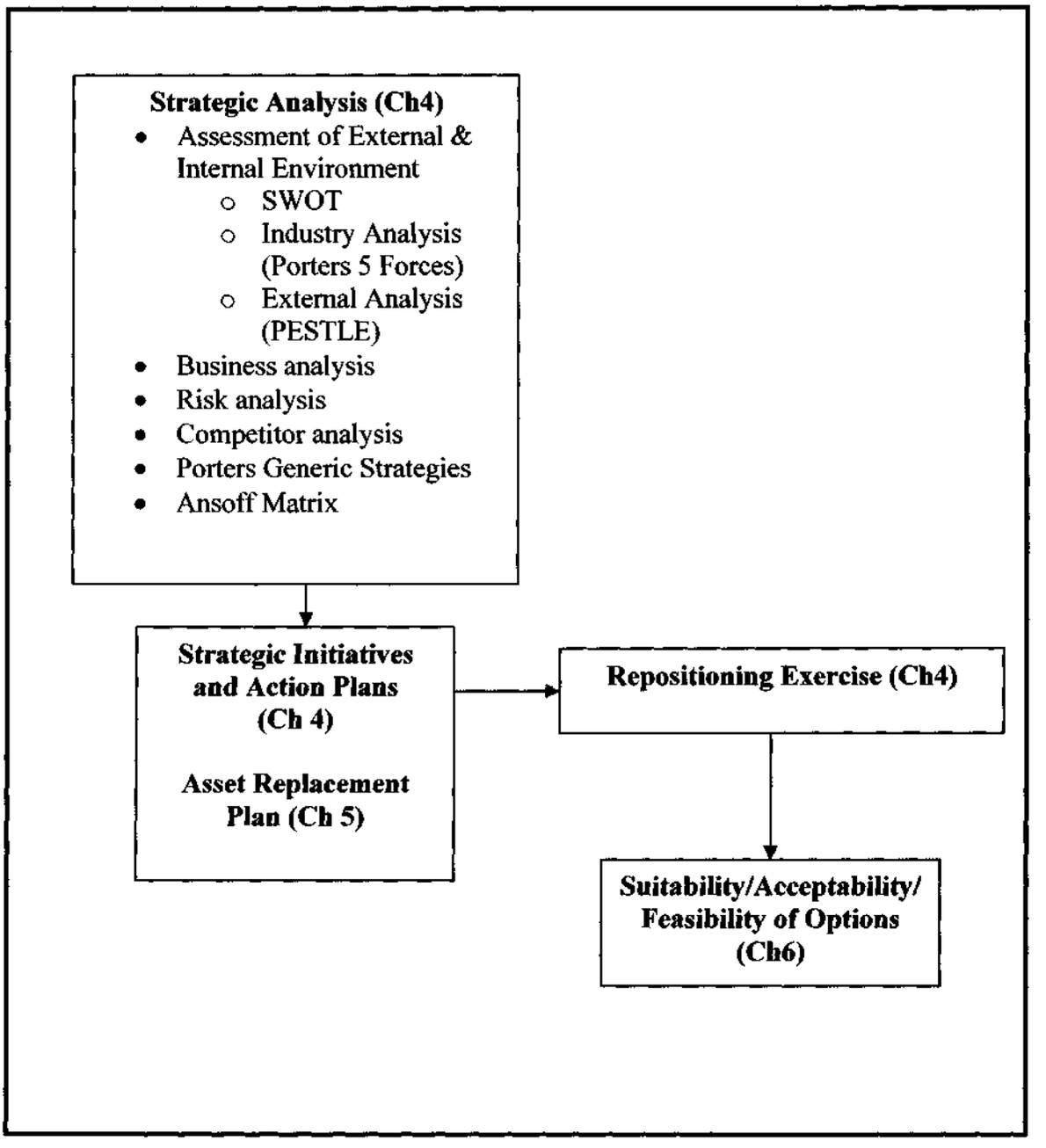


Figure 2.10 Strategic Analysis Framework, (Source: adapted from Johnson & Scholes: 2002, p354)

Strategic analysis

Included under the strategic analysis are the Mission statement, PESTLE, SWOT analysis, Competitive advantage, Porters five forces and Ansoff matrix. The applicability of these tools are shown and they are used as a basis for the future strategy initiatives to grow the business.

Strategic initiatives and Action Plans

These are included in Chapter 4 utilising a 'Balanced Scorecard Approach'.

- Behavioural: Inculcate behaviour embracing core values amongst employees.
- Internal Business: Optimising infrastructure and business processes to enhance logistic chains timeously
- Learning and Innovation: Develop business skills and embed innovation as a core competence
- Customer and Stakeholder: Create winning customers and stakeholders through service excellence.
- Financial: Value and wealth creation

Repositioning Exercise

To position D.S. competitively in the market and increase market share through the identification of viable business options to be pursued over the next 5 years.

Assessment of Suitability/Acceptability/Feasibility of Options

To determine the Suitability (viability), Acceptability, Feasibility, Timing and Sustainability of each of the above options, a more detailed analysis (included in Chapter 5) was done for each of the opportunities, by rating each according to a set of criteria to determine the demand and attractiveness, the investment impact, the risk as well as impact on training, resources and systems. The weights assigned were as follows:

Measure	Criteria considered to determine measure	Weight (%)
Market Demand	• Frequency • (New) Revenue opportunities • Historical and future growth potential	30
Market Attractiveness	• Competitiveness in this market (i.e. other players) • Barriers to entry • Price sensitivity • Competitive advantage (i.e. of dredging services in this market)	20
Investment Impact	• The investment needs to enter this market	15
Risk	• The level of risk attached to entering this market	15
Resource Impact	• The impact on dredging resources in terms of both numbers and skills	10
Training Impact	• Whether specific training is required to enter this market	5
Systems Impact	• Whether new/existing systems could be utilised	5

CHAPTER 3: RESEARCH METHODOLOGY

In order to choose an appropriate research methodology it is necessary to understand the difference between Qualitative and Quantitative research.

Byrne (2001) states that 'any definition of qualitative research would be elusive, vague, and imprecise' due to the term 'qualitative' encapsulating such a 'broad umbrella of research methods'. However, Byrne attempts to define qualitative research as 'inquiries of knowledge that are outside the framework prescribed by the scientific method, as well as assumptions of inferential statistics'. Other commentators agree with this ambiguity of definition. Preissle (2002) confirms that 'qualitative research is a loosely defined category of research designs or models, all of which elicit verbal, visual, tactile, olfactory, and gustatory data in the form of descriptive narratives like field notes, recordings, or other written records'. This is relevant to the DS case where the inquiry of knowledge is outside a scientific framework as well as the case comprising of a compilation of "written records".

Methods of qualitative research include action research, case study research, Delphi studies, grounded theory, life histories, hermeneutics, or general narrative enquiry or participant observer research. Emphasis is placed on the importance of looking at variables in the natural setting in which they are located. Detailed data is captured through open-ended questions using techniques such as historical analysis, focus groups, interviews, surveys, questionnaires, and diaries. Qualitative research is 'mainly concerned with the properties, the state and the character', (Labuschagne 2003).

Quantitative research is more easily defined as the collection of numerical and statistical data. Harvey (2002) describes quantitative data as 'data which can be sorted, classified, measured in a strictly "objective" way - they are capable of being accurately described by a set of rules or formulae or strict procedures which then make their definition (if not always their interpretation) unambiguous and independent of individual judgments'.

Qualitative research usually achieves a greater level of depth and detail than quantitative techniques, however fewer subjects tend to be studied resulting in a study being more difficult to generalise. Qualitative methods are preferred when researching sensitive subjects. Rather than being constrained by pre-set answers, they allow sensitive subjects to be approached in a sensitive way by allowing the researcher to employ personal skills to help lessen the difficulties of the subject matter. Qualitative methods create openness between all parties and can help generate new theories. Participating subjects can discuss issues that are important to them, rather than responding to closed questions, and they can also clarify ambiguities or confusion over concepts. 'It certainly seems reasonable to suggest that one may have a better understanding of a community members situation by reading a descriptive passage than just looking at demographic statistics', (Kruger, 2003).

Additionally, observation can take place allowing attitudes to be revealed, and patterning and interrelationships to be observed.

Kruger (2003) confirms that 'quantitative methods allow us to summarize vast sources of information and facilitate comparisons across categories and over time'. However the research is often carried out in an unnatural, artificial environment so that a level of control can be applied to the exercise. This level of control might not normally be in place in the real world yielding laboratory results as opposed to real world results. In addition preset answers will not necessarily reflect how people really feel about a subject and in some cases might just be the closest match. The development of standard questions by researchers can lead to 'structural' bias and false representation, where the data actually reflects the view of them instead of the participating subject.

In comparison to qualitative methods, quantitative methods collect a much narrower and sometimes superficial dataset. Results are limited as they provide numerical descriptions rather than detailed narrative and generally provide less elaborate accounts of human perception. Additionally, these statistics can be humanely insignificant, therefore yielding insignificant results. Kruger (2003) discusses how it can be 'difficult to get the real meaning of an issue by looking at numbers'.

It is thus clear from the discussion above that the most suited research methodology for the DS case is the use of Qualitative methods as;

- the data for DS cannot be sorted, classified and measured in a strict way and is not scientific or statistical in nature,
- the research problem requires a greater level of depth and detail,
- detailed data will be best captured through open-ended questions,
- this method is more suited to create openness between all parties and can help generate new ideas. "Participating subjects can discuss issues that are important to them, rather than responding to closed questions, and they can also clarify ambiguities or confusion over concepts."
- observation can take place allowing attitudes to be revealed.

The Case study approach will be adopted together with the use of interviews of the executive committee members of Dredging Services.

Zonabend (1992) stated that case study is done by giving special attention to completeness in observation, reconstruction, and analysis of the cases under study. Case study is done in a way that incorporates the views of the "actors" in the case under study.

Strauss and Glaser (1967) developed the concept of "grounded theory." This along with some well regarded studies accelerated the renewed use of the methodology.

A frequent criticism of case study methodology is that its dependence on a single case renders it incapable of providing a generalizing conclusion. Yin (1993) presented Giddens' view that considered case methodology "microscopic" because it "lacked a sufficient number" of cases. Hamel (Hamel et al., 1993) and Yin (1984, 1989a, 1989b, 1993, 1994) forcefully argued that the relative size of the sample whether 2, 10, or 100 cases are used, does not transform a multiple case into a macroscopic study. The goal of the study should establish the parameters, and then should be applied to all research. In this way, even a single case could be considered acceptable, provided it met the established objective.

Yin (1989a) stated that the Case study method can be seen to satisfy the three tenets of the qualitative method: describing, understanding, and explaining.

The literature contains numerous examples of applications of the case study methodology. The earliest and most natural examples are to be found in the fields of Law and Medicine, where "cases" make up the large body of the student work. However, there are some areas that have used case study techniques extensively, particularly in government and in evaluative situations. The government studies were carried out to determine whether particular programs were efficient or if the goals of a particular program were being met. The evaluative applications were carried out to assess the effectiveness of educational initiatives. In both types of investigations, merely quantitative techniques tended to obscure some of the important information that the researchers needed to uncover.

The body of literature in case study research is "primitive and limited" (Yin, 1994), in comparison to that of experimental or quasi-experimental research. The requirements and inflexibility of the latter forms of research make case studies the only viable alternative in some instances. It is a fact that case studies do not need to have a minimum number of cases, or to randomly "select" cases. The researcher is called upon to work with the situation that presents itself in each case.

Case studies can be single or multiple-case designs, where a multiple design must follow a replication rather than sampling logic. When no other cases are available for replication, the researcher is limited to single-case designs (as in the DS case). Yin (1994) pointed out that generalization of results, from either single or multiple designs, is made to theory and not to populations.

There are several examples of the use of case methodology in the literature. Yin (1993) listed several examples along with the appropriate research design in each case. There were suggestions for a general approach to designing case studies, and also recommendations for *exploratory*, *explanatory*, and *descriptive* case studies. Each of

those three approaches can be either single or multiple-case studies, where multiple-case studies are replicatory, not sampled cases.

In *exploratory* case studies, fieldwork, and data collection may be undertaken prior to definition of the research questions and hypotheses. This type of study has been considered as a prelude to some social research. However, the framework of the study must be created ahead of time. Survey questions may be dropped or added based on the outcome of the pilot study. Selecting cases is a difficult process, but the literature provides guidance in this area (Yin, 1989a). Stake (1995) recommended that the selection offers the opportunity to maximize what can be learned, knowing that time is limited.

Explanatory cases are suitable for doing causal studies. In very complex and multivariate cases, the analysis can make use of pattern-matching techniques. Yin and Moore (1988) conducted a study to examine the reason why some research findings get into practical use. They used a funded research project as the unit of analysis, where the topic was constant but the project varied. The utilization outcomes were explained by three rival theories: a knowledge-driven theory, a problem-solving theory, and a social-interaction theory.

Descriptive cases require that the investigator begin with a descriptive theory, or face the possibility that problems will occur during the project. Pyecha (1988) used this methodology to study special education, using a pattern-matching procedure. Several states were studied and the data about each state's activities were compared to another, with idealized theoretic patterns. Thus what is implied in this type of study is the formation of hypotheses of cause-effect relationships. Hence the descriptive theory must cover the depth and scope of the case under study. The selection of cases and the unit of analysis is developed in the same manner as the other types of case studies.

Case studies have been used to develop critical thinking (Alvarez, et al., 1990). Yin (1994) recommended the use of case-study protocol as part of a carefully designed research project that would include the following sections:

- Overview of the project (project objectives and case study issues)

- Field procedures (credentials and access to sites)
- Questions (specific questions that the investigator must keep in mind during data collection)
- Guide for the report (outline, format for the narrative) (Yin, 1994, p. 64)

The quintessential characteristic of case studies is that they strive towards a holistic understanding of cultural systems of action (Feagin, Orum, & Sjoberg, 1990). Cultural systems of action refer to sets of interrelated activities engaged in by the actors in a social situation. The case studies must always have boundaries (Stake, 1995). Case studies tend to be selective, focusing on one or two issues that are fundamental to understanding the system being examined.

Case studies are multi-perspectival analyses. This means that the researcher considers not just the voice and perspective of the actors, but also of the relevant groups of actors and the interaction between them. This one aspect is a salient point in the characteristic that case studies possess. They give a voice to the powerless and voiceless. When sociological studies present many studies of the homeless and powerless, they do so from the viewpoint of the "elite" (Feagin, Orum, & Sjoberg, 1991).

Case study is known as a triangulated research strategy. Snow and Anderson (cited in Feagin, Orum, & Sjoberg, 1991) asserted that triangulation can occur with data, investigators, theories, and even methodologies. Stake (1995) stated that the protocols that are used to ensure accuracy and alternative explanations are called triangulation. The need for triangulation arises from the ethical need to confirm the validity of the processes. In case studies, this could be done by using multiple sources of data (Yin, 1984). The problem in case studies is to establish meaning rather than location.

Designing the Case Study

Yin (1994) identified five components of research design that are important for case studies:

- A study's questions

- Its propositions, if any
- Its unit(s) of analysis
- The logic linking the data to the propositions
- The criteria for interpreting the findings (Yin, 1994, p. 20).

The study's questions are most likely to be "how" and "why" questions, and their definition is the first task of the researcher.

For the DS case the question is "how it can change its current mode of operation in order to create capacity for additional work that is required for it to become sustainable."

The study's propositions sometimes derive from the "how" and "why" questions, and are helpful in focusing the study's goals. Not all studies need to have propositions. An exploratory study, rather than having propositions, would have a stated purpose or criteria on which the success will be judged.

For DS the propositions are;
to develop a business plan which will enable DS to 'create' capacity to allow for external work to be accomplished, thereby facilitating business sustainability and,
to develop an asset replacement plan which will support the external work initiatives of the business

The unit of analysis defines what the case is. This could be groups, organizations or countries, but it is the primary unit of analysis. The unit of analysis will be Dredging Services.

Linking the data to propositions and the criteria for interpreting the findings are the least developed aspects in case studies (Yin, 1994). Campbell (1975) described "pattern-matching" as a useful technique for linking data to the propositions. Campbell (1975) asserted that pattern-matching is a situation where several pieces of information from the same case may be related to some theoretical proposition.

Construct validity is especially problematic in case study research. It has been a source of criticism because of potential investigator subjectivity. Yin (1994) proposed three remedies to counteract this: using multiple sources of evidence, establishing a chain of evidence, and having a draft case study report reviewed by key informants. The latter will used, where DS executive committee members will review the case study .

Internal validity is a concern only in causal (explanatory) cases. This is usually a problem of "inferences" in case studies, and can be dealt with using pattern-matching, which has been described above. External validity deals with knowing whether the results can be generalized beyond the immediate case. Some of the criticism against case studies in this area relate to single-case studies. However, that criticism is directed at the statistical and not the analytical generalization that is the basis of case studies. Reliability is achieved in many ways in a case study. One of the most important methods is the development of the case study protocol.

Case studies can be either single or multiple-case designs. Single cases are used to confirm or challenge a theory, or to represent a unique or extreme case (Yin, 1994). Single-case studies are also ideal for revelatory cases where an observer may have access to a phenomenon that was previously inaccessible. Single-case designs require careful investigation to avoid misrepresentation and to maximize the investigator's access to the evidence. These studies can be holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis. Each individual case study consists of a "whole" study, in which facts are gathered from various sources and conclusions drawn on those facts.

A case study protocol contains more than the survey instrument, it should also contain procedures and general rules that should be followed in using the instrument. It is to be created prior to the data collection phase. It is essential in a multiple-case study, and desirable in a single-case study. Yin (1994) presented the protocol as a major component in asserting the reliability of the case study research. A typical protocol should have the following sections:

- An overview of the case study project (objectives, issues, topics being investigated)
- Field procedures (credentials and access to sites, sources of information)
- Case study questions (specific questions that the investigator must keep in mind during data collection)
- A guide for case study report (outline, format for the narrative) (Yin, 1994, p. 64).

The overview should communicate to the reader the general topic of inquiry and the purpose of the case study. The field procedures mostly involve data collection issues and must be properly designed. The investigator does not control the data collection environment (Yin, 1994) as in other research strategies; hence the procedures become all the more important. During interviews, which by nature are open ended, the subject's schedule must dictate the activity (Stake, 1995). Gaining access to the subject organization, having sufficient resources while in the field, clearly scheduling data collection activities, and providing for unanticipated events, must all be planned for.

Case study questions are posed to the investigator, and must serve to remind that person of the data to be collected and its possible sources. The guide for the case study report is often neglected, but case studies do not have the uniform outline, as do other research reports. It is essential to plan this report as the case develops, to avoid problems at the end.

Stake (1995), and Yin (1994) identified at least six sources of evidence in case studies. The following is not an ordered list, but reflects the research of both Yin (1994) and Stake (1995):

- Documents
- Archival records
- Interviews
- Direct observation
- Participant-observation
- Physical artifacts

Documents could be letters, memoranda, agendas, administrative documents, newspaper articles, or any document that is germane to the investigation. In the interest of triangulation of evidence, the documents serve to corroborate the evidence from other sources. Documents are also useful for making inferences about events. Documents can lead to false leads, in the hands of inexperienced researchers, which has been a criticism of case study research. Documents are communications between parties in the study, the researcher being a vicarious observer; keeping this in mind will help the investigator avoid being misled by such documents.

Archival documents can be service records, organizational records, lists of names, survey data, and other such records. The investigator has to be careful in evaluating the accuracy of the records before using them. Even if the records are quantitative, they might still not be accurate.

Interviews are one of the most important sources of case study information. There are several forms of interviews that are possible: Open-ended, Focused, and Structured or survey. In an open-ended interview, key respondents are asked to comment about certain events. They may propose solutions or provide insight into events. They may also corroborate evidence obtained from other sources. The researcher must avoid becoming dependent on a single informant, and seek the same data from other sources to verify its authenticity.

The focused interview is used in a situation where the respondent is interviewed for a short period of time, usually answering set questions. This technique is often used to confirm data collected from another source.

The structured interview is similar to a survey, and is used to gather data in cases such as neighborhood studies. The questions are detailed and developed in advance, much as they are in a survey.

Direct observation occurs when a field visit is conducted during the case study. It could be as simple as casual data collection activities, or formal protocols to measure and record behaviors. This technique is useful for providing additional information about the

topic being studied. The reliability is enhanced when more than one observer is involved in the task. Glesne and Peshkin (1992) recommended that researchers should be as unobtrusive as the wallpaper.

Participant-observation makes the researcher into an active participant in the events being studied. This often occurs in studies of neighborhoods or groups. The technique provides some unusual opportunities for collecting data, but could face some major problems as well. The researcher could well alter the course of events as part of the group, which may not be helpful to the study.

Physical artifacts can be tools, instruments, or some other physical evidence that may be collected during the study as part of a field visit. The perspective of the researcher can be broadened as a result of the discovery.

It is important to keep in mind that not all sources are relevant for all case studies (Yin, 1994). The investigator should be capable of dealing with all of them, should it be necessary, but each case will present different opportunities for data collection.

For the DS case the documents, archival records, interviews and direct observation will provide sources of evidence.

Analyzing Case Study Evidence

This aspect of the case study methodology is the least developed and hence the most difficult. As a result, some researchers have suggested that if the study were made conducive to statistical analysis, the process would be easier and more acceptable. This quantitative approach would be appealing to some of the critics of the case study methodology. However not all case studies lend themselves to this type of analysis. Miles and Huberman (1984) suggested analytic techniques such as rearranging the arrays, placing the evidence in a matrix of categories, creating flowcharts or data displays, tabulating the frequency of different events, using means, variances and cross tabulations to examine the relationships between variables, and other such techniques to facilitate analysis.

There must first be an analytic strategy, which will lead to conclusions. Yin (1994) presented two strategies for general use: One is to rely on theoretical propositions of the study, and then to analyze the evidence based on those propositions. The other technique is to develop a case description, which would be a framework for organizing the case study. The latter will be utilised for the DS case.

Yin (1994) encouraged researchers to make every effort to produce an analysis of the highest quality. In order to accomplish this, he presented four principles that should attract the researcher's attention:

- Show that the analysis relied on all the relevant evidence
- Include all major rival interpretations in the analysis
- Address the most significant aspect of the case study
- Use the researcher's prior, expert knowledge to further the analysis

Eisner and Peshkin (1990) placed a high priority on direct interpretation of events, and lower on interpretation of measurement data, which is another viable alternative to be considered.

There have been some valuable sources of information and guidance for case study methodologies. Hamel (Hamel et al., 1993), Stake (1995), and Yin (1984, 1989a, 1994) in particular have provided specific guidelines for the development of the design and execution of a case study.

Case study has been shown above as a valuable method of research which is relevant and can be applied to the DS research problem.

DATA COLLECTION METHODS AND ANALYSIS

Secondary data is to be collated and researched, the sources of which are dredging and hydrographic survey business reports, strategy books and relevant web sites. In addition interviews will be held with current executive committee members of Dredging Services. The interviews will be focussed, in that those interviewed will answer set questions to

understand their impression of the current status. However the interview will also contain open ended questions where they can provide their opinions and suggestions on what initiatives will be able to make DS sustainable.

Interview Questions

Name :

Designation :

Years of Service :

Q1: What opportunities are available to the business?

Q2: What are the top 3 challenges facing DS as a business?

Q3: Comment on what can be improved in your own department to facilitate DS sustainability?

Q4: Comment on what can be done in other departments to facilitate DS sustainability?

Q5: Is there any other input you have on what needs to be changed in DS to improve?

The following EXCO members will be interviewed;

Financial Manager	:	Kelly Bengtson
HR Manager	:	Seetha Bikramchund
Hydro Manager	:	Yogan Kotiah
Senior Mech. Engineer	:	Muhammad Bilal Khan
Crewing Manager	:	Capt. Jan Brouwer
Risk Manager	:	Gerry Otto

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Strategic Objectives and Initiatives

This business plan, using the framework established in Chapter 2, details the following strategic objectives and initiatives to supplement the existing DS business plans that will assist to realise its strategy:

4.2 Assessment of the External and Internal Business Environment

The tables 4.3 and 4.4 below provide an overview of the major external and internal factors affecting DS. The implications of the identified factors are assessed in conjunction with their impact in Time, Type and by Dynamics. This assists with the allocation of their importance on a relative scale.

External Factors						
	External Factors Affecting the Dredging	**Implications of Factors for Dredging**	**Relative Importance of Implications of External Factors**			
			Time	**Type**	**Dynamics**	**Relative Importance**
Political	NPA Bill	The ownership implications for DS	5Y	P/N	I	C
	NEPAD/SADC	Leverage to obtain opportunities in the African market	3Y	P	I	VI
Economical	Value of the Rand	Impacts DS profitability	Ongoing	P/N	U	S
Social	Scarcity dredging skills in local labour market	Invest in skills development	3Y	N	I	VI
Technological	Customer requirements	Investment in technology	Ongoing	N	I	VI

Table 4.3: Major External Factors affecting D.S.

Internal Factors						
	Internal Factors Affecting the Dredging	Implications of Factors for Dredging	Relative Importance of Implications of Internal Factors			
			Time	Type	Dynamics	Relative Importance
Organisational Structure	Insufficient employee numbers to support a 24 hour operation	Non optimal use of all equipment	3Y	N	I	VI
Equipment	Ageing Fleet	Reduced availability, productivity and reliability	5Y	N	I	C
HR	Shortage of dredging skills	Reduced productivity	3Y	N	I	VI
Market	Focus on market growth	Improved usage of resources	5Y	P	I	VI

Table 4.4: Major Internal Factors affecting D.S.

Legend:

- **Type:** Positive (P) or negative (N) impact
- **Dynamics:** Impact of increasing (I), unchanged (U) or decreasing (D) significance
- **Relative Importance:**
    - **Critical (C):** Threatens the existence of DS - review of mission and core values
    - **Very Important (VI):** Significant changes in established DS without compromising its mission and core values
    - **Important (I):** Limited changes to DS without compromising its mission and core values
    - **Significant (S):** No serious affect on DS without compromising its mission and core values
    - **Unimportant (U):** No affect on DS

4.3 Critical Opportunities and Challenges

The following opportunities and challenges have been identified for Dredging Services:

Critical Opportunities:

- Maintaining and growing internal and external market

Critical Challenges/Risks:

- Ageing fleet
- Skills depletion
- Employee acceptance to business change / re-engineering – 24 hour working
- Improved resource utilisation
- Successful implementation of an adequate asset replacement plan and maintenance strategy

4.4. Business Analysis

4.4.1 Business Environment over the next 5 years relative to what the business does

As detailed previously Dredging Services offers the following services:

- Dredging/Hydrographic Project planning
- Dredging/Hydrographic Project management
- Hydrographic Surveys
- Dredging including:
    - Bow Pipe dredging
    - Side Trail dredging
    - Grab Dredging
    - Bed Levelling
    - Reclamation
    - Beach Nourishment
- Depth management services
- Dam surveys and dredging
- Consultancy services including training

Opportunity	Year 1 (2006/07)	Year 2-3 (2007-09)	Year 4-5 (2009-11)	> Year 5 After 2011
2.3 Consultancy – Africa and internationally, including training	X			
2.5 (c) Provide Developed Skills – resources	X			
2.1 (a) Maintenance dredging in Africa		X		
2.10 Sand Bypass System (operate and maintain)		X		
2.4 Depth Management to ports	Continue			
2.7 Dredging and surveying of Dams	Continue			
2.9 Usability of Dredging Process By-products			X	
2.8 (a) Hydrographic Surveys – Africa		X		
2.10 Beach Nourishment		X		
2.5 (b) Provide Developed Skills – Hydro equipment		X		
2.2 (b) Capital Dredging (existing equipment)		X		
2.2 (a) Capital Dredging (new equipment)		X		
2.6 Submerged Foreign Object Recovery			X	
2.5 (a) Provide Developed Skills – Dredging equipment			X	
2.8 (b) Hydrographic Surveys – International			X	
2.1 (b) Maintenance dredging Internationally				X

4.4.2 Market Analysis

Dredging Services' market has two key segments:

- Local market
- Potential African market

The local market comprises the following:

- Port of Richards Bay on an ongoing basis
- Port of Durban on an ongoing basis
- Port of East London on an annual basis

- Port of Port Elizabeth on an annual basis
- Port of Ngqura on an annual basis
- Port of Mossel Bay on an annual basis
- Ports of Cape Town and Saldanha as and when required

The African market is somewhat unknown to Dredging Services, but maintenance dredging is naturally required to overcome siltation, at all Ports that form the end of any major river. In addition, the erosive effects of the currents on the East Coast of Africa require beaches to be nourished. A list of some possible markets are listed in Table 4.7: Possible African Market Customers.

Table 4.7: Possible African Market Customers (Source: DS Report on Dredging in African Countries, 2006)

Country	Port	Remarks	Comments	Likelihood of Dredging
Angola	Cabinda	Coastal		Medium
	Lobito	Coastal		Medium
	Luanda	Coastal		Medium
	Benguella	Coastal		Medium
	Matadi	River		High
Comoras	Moroni	Coastal		Medium
Congo	Pointe Noire	Coastal		Medium
	Brazzaville	River		High
Gabon	Gabon	River		High
	Libreville	River		High
	Port Gentil	River		High
Gambia	Banjul	River		High
Guinea	Conakry	Coastal	Dredging program in place	High
Guinea bissau	Bissau	River		High
Kenya	Mombasa	Coastal		Medium
Mauritius	Port Louis	Coastal		Medium
Mozambique	Quelimane	River		High
	Chinde	River		High
	Beira	River		High
	Maputo	River		High
	Pemba	River		High
	Nacala	River		High
	Inhambane	River		High
	Macuse	River		High
	Pebane	River		High
Namibia	Walvis Bay	Coastal	Works undertaken here	Medium
	Luderitz	Coastal	Works undertaken here	Medium
Nigeria	Apapa	Coastal		Medium
	Port Harcourt	Coastal		Medium
	Warri	Coastal		Medium
	Koka	Coastal		Medium
	Sapele	Coastal		Medium
	Alajda	Coastal		Medium
	Escravos	Coastal		Medium
	Forcados	Coastal		Medium
	Pennington	Coastal		Medium
	Calabar	Coastal		Medium
Senegal	Dakar	Coastal		Medium
Somalia	Mogadishu	Coastal		Medium
Tanzania	Dar-es-salaam	Coastal		Medium
	Tanga	Coastal		Medium
Toga	Lome'	Coastal		Medium
Zanzibar	Zanzibar	Coastal		Medium
Cameroon	Bangui	River		High

Local Market	African Market
Size of key segments	
• The Port Engineer's at the various ports decide on the dredging requirements for the year. • The municipalities in the various Ports decide on the beach nourishment requirements for the year. . • Dredging Services uses the Port Engineer and City Council's budgets to determine their yearly work plan. • The size of the local market is therefore reasonably predictable, and would only drastically increase in the event of a flood.	• The size of the African market is somewhat unknown. • However, Ports such as Maputo, Walvis Bay, Luderitz and Cabinda have already expressed interest in having contract dredging works undertaken, and will most likely therefore require regular maintenance dredging in the future. (DS marketing plan 05/06)
Rate of growth	
• The local maintenance dredging market is fairly constant, bar the new dredging requirement that will result from the Port of Ngqura coming online. • General infrastructure upgrade investment has however prompted the need for capital dredging in the near term, as evidenced by the Durban 2005 project, the Container terminal expansion at the Port of Cape Town, the East London car terminal expansion, the Richards Bay Coal Terminal expansion and the nourishment of beaches at the Port of Saldanha.	• The African market is as yet untapped, and for Dredging Services represents significant growth potential
Buyer needs	
• The Port Engineer's are well versed in the requirements for dredging in the various ports. Their needs are simply that the port depth be as promulgated by the Harbour Masters. • The City Council need is normally determined by the littoral drift effect on the beaches. However, they occasionally require additional sand for beach volleyball tournaments etc.	• African market customer's access to international funding for infrastructure investment has significantly improved of late thus enabling these authorities to invest in Port upgrade activities. • These activities normally include the need for capital dredging work, and subsequent maintenance dredging work thereafter.
Switching costs	
• The National Ports Authority employs the Port Engineer's. In addition, it is company policy to offer the right of first refusal to an in-house service provider, if one exists. Therefore, as long as Dredging Services is a part of National Ports Authority, with intent to execute the work, the Port Engineer's will be obliged to use them. • The City Councils however are not bound by	• Dredging Services does not currently service the African market. Maintenance dredging in these markets would be pursued on a fixed term maintenance contract basis, and within the contractual period, switching costs would therefore be high.

the same rules. They could easily opt to have sand transported to the beach by truck if it proved financially viable.	
Barriers to entry/exit	
• Dredging Services, as a business unit of National Ports Authority of South Africa, cannot exit the local market. • Other service providers can enter the local market.	• One of the most significant barriers to entry into the African Market is the lack of financial resources in some of the African countries. This situation is however improving.

4.4.3 Expected changes in technology and best practices

Dredging Services has identified Capital Dredging as a business opportunity. This will require the acquisition/leasing of a Cutter suction Dredger or possibly entering into a joint ventures with those companies that possess such equipment. Dredging Services Asset Replacement plan (Detailed in Chapter 5) makes provision for the acquisition of a new trailing suction hopper Dredger in 2009 as well as a Cutter Suction Dredger in 2012.

A process equipment upgrade of the Dredger Ingwenya will is planned for 2008 at an estimated cost of R 60million.

R&D into equipment advances has revealed the availability of a new cutter head and pump, to increase versatility on the grab dredger. A proper feasibility assessment will be undertaken in future.

Investigations have been conducted into the usefulness of a remote operated vehicle to carry out underwater inspections. This will reduce the expenditure on diving teams and facilitate preventative maintenance.

4.4.4 SWOT Analysis

STRENGTHS	WEAKNESSES
• Captive market within the NPA • Geographical location and proximity to chosen markets • Adequate knowledge and experience of local conditions • Adequate current dredging and hydro-graphic survey skills for current market • Suitable dredging and hydro-graphic equipment for current market • Low turnover of key dredging and support staff • Established business unit with processes and controls in place (e.g. ISO	• Lack of international experience and international contract management. • Personnel not representative of demographics. • Ageing fleet (high cost of maintenance and replacement). • Lack of market intelligence of International dredging markets • Legacy of break-even policy (no capital reserves). • A few core strengths and lack of electronic expertise. • Insufficient project management skills.

9001:2000) • Customers satisfied with performance • Cadet and Marine Navigating Officer trainee scheme in place • Sound labour relations • Committed management team • Access to capital	• Lack of culture of innovation. • High turnover of marine engineers. • Profitability is sub par due to constrained turnover. • Under-utilised equipment capacity in comparison to international norms (work at night not being done). • Insufficient research and development. • Inadequate equipment maintenance strategy. • Dependant on a few products • Hydrographic survey • Maintenance dredging • Low morale. • Lack of formal quality management system. • Labour relations and management thereof. • High age profile of key personnel. • Succession planning. • Not capitalising on IT and electronic advancements. •
OPPORTUNITIES • Provide a comprehensive hydro-graphic survey service to external market • Provide a maintenance dredging service to external customers • Provide capital dredging services • Provide developed skills to others (African Renaissance – Portcon) • Nourishing beaches • Usability of dredging process by-product's • Recovery of submerged foreign objects • Charter of survey craft • Depth management service (vertical integration) • Dredging and surveying of dams • Provide training in dredging and hydrographic skills through the NPA Port Academy. • Provide dredging and hydrographic equipment to external clients • Joint ventures (marketing / Portcon) • Develop skills base • Sand Bypass Schemes (these are fixed pump systems which can be installed to eliminate sand trap dredging in the Ports) can be managed by DS.	**THREATS** • International competition • Environmental awareness pressure • Sand By-pass schemes. (If not under DS control will reduce Dredging volumes (i.e. reduce DS income). • Spares availability for current / ageing fleet. • Skills depletion (external job offers).

Table 4.5 DS SWOT Analysis (Adapted from DS Business plan 2005/2006)

4.4.5 Existing risk and governance issues

ID RISK	REDUCE LIKELIHOOD	REDUCE IMPACT	EARLY WARNING SYSTEM	CONTINGENCIES
Ageing fleet	Monitoring craft condition / Compliance with legislative requirement (SAMSA as regulator)	Preventive maintenance systems / maintenance strategy	Auditing / corrective preventive action as per ISO 9001: 2000 & Seasafe standards	Enter into Memorandum of understanding with International Dredging companies to access their Dredgers if required
Skills depletion	Ensure appropriate human resource retention & training schemes	Cadet training programs / Build employee capacity	Monitoring employee turnover & action	Succession planning & multi-skilling / Hiring in of skills
High age profile	Creation of adequate bench strength /	Cadet training programs / Build employee capacity	Monitoring employee turnover & implement action	Succession planning & multi-skilling / Cross training
Impact of aids & HIV	Promote preventative Awareness / Train peer educators	Develop & implement NPA HIV / AIDS strategy	Establish NPA perceived exposure / Encourage VCT / Roll out home based care training	Succession planning & multi-skilling
Environmental systems	Effective waste management program As part of ISO 14000	Terminating process impacting on environment / substitution of	Conduct marine fauna & flora surveys / environmental risk assessments	As per the environmental aspects and impacts register.
Impact of closure of port entrance channel	Implement procedures to ensure compliance with Harbour Regulations	Implement Business Continuity Plans (BCP) / Conduct simulation exercises	Compliance monitoring and systems auditing	As per BCP plans of NPA ports & Dredging Services Memo of understanding with other dredging companies.

Table 4.6 Existing Risk and Governance Issues (Source: Marketing plan DS risk manager)

4.5. Strategic Initiatives and Action Plans

Business initiatives and actions have been identified to assist DS achieve its strategic objectives. These are listed below.

	Financial	Customer and Stakeholder	Internal Business	Innovation and Learning	Behavioural
Strategic Objective	Value and wealth creation	Create winning customers and stakeholders through service excellence	Optimizing infrastructure and business processes to enhance logistics chains timeously	Develop people's business skills and embed innovation as a core competence	Inculcate behaviour embracing NPA core values amongst all employees
Strategic Initiatives	1. Grow DS revenue through business development	1. Create and maintain a strong stakeholder relationship	1. Monitor, evaluate and improve business performance	1. Develop and implement training programmes to enhance business, technical , creativity and innovation competencies	1. Live NPA values
	2. Manage and contain costs	2. Inculcate a customer service culture	2. Effective and efficient maintenance	2. Ensure retention of skills for the future	
			3. Compliance of port security, environment and other corporate governance practices and risk management.	3. Research dredging and hydro industry environment	
			4. Compliance with EE and BEE targets	4. Entrench a culture of knowledge transfer and sharing	

4.6 Opportunity and Issue Analysis

PESTLE ANALYSIS

Table 4.8: PESTLE Analysis

Political	**Economical**
• Ports Policy - infrastructure maintenance may be influenced • Uncertainty - restructuring of SOE's (Parastatals) • High Trade Union influence • Compliance with legislation • NEPAD • SADC	• Fluctuation of the (R/$) influence the maintenance cost of the fleet. It also provides an opportunity to new markets • Cost impact of HIV/AIDS
Social	**Technological**
• HIV/AIDS impact on personnel turnover • Scarcity dredging skills in local labour market • Shift from labour intensive to technology based careers • Expectation of socially responsible business (CSI)	• Sand By-pass technology will reduce dredging requirement • Automated equipment • Information Communication Technology (ICT) • Impact of latest dredging techniques / advancements (expertise)–Trends in efficient dredging processes – technological
Legal	**Environmental**
• Merchant Shipping Act (Act 57 of 1951). • SOLAS (Safety of Life At Sea Act). • OHSACT (Act 85 of 1993). • Public Finance Management Act. • Public Access to Information Act. • Ships Oil Pollution Emergency Plan (SOPEP) and MARPOL. • BCEA. • Labour Relations Act. • Employment Equity Act. • Skills Development and Levies Act • Legal Succession Act. • ISM Code (International Safety Management code). • Compensation for Occupational Injuries and Diseases Act. • Harbour Regulations. • International Maritime Organisation Convention	• Impact of the London Convention (disposal of spoil/dredging areas etc.) • Compliance with MARPOL (Marine Pollution) • Visual impact of dredging (negative perception) • Ensure safe work environment • Disposal of waste (paper, contaminated fuel, rags, blast material, etc.)

Opportunity/Threat matrix

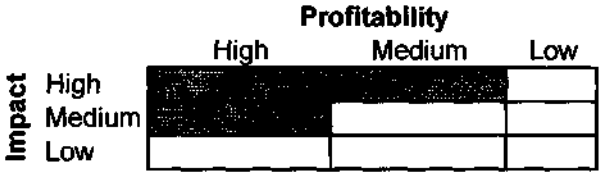


Figure 4.1: Profitability/Impact Matrix

Opportunities and Threats all fall within the shaded area of the diagram, and are therefore focus areas.

All of these opportunities and threats relate in some way to the African market.

Target markets

4.6.1 Local Market

The size of the local market appears to be fairly constant. Port Engineer's normally budget for more dredging than the minimum required to keep the port operational. This reserve, they retain for any unforeseen occurrences, and very readily reduce the dredging requirements should the need arise.

Dredging Services compiles their yearly production plan based on these volumes, and carefully balances their anticipated expenditure against these volumes to determine a dredging rate.

Although the volume changes are capped by certain contractual obligations, due to the high proportion of fixed costs in relation to variable costs that are inherent in this type of business, a small reduction in quantities results in a loss of revenue by Dredging Services.

4.7 Objectives

Business Objectives

Ansoff's Growth Matrix

Dredging Services' is in the position to be able to offer current products to both existing and new customers.

	Current	**New Products**
Current Markets	Market Penetration	Product Development
New Markets	Market Development	Diversification Strategies

Figure 4.2: Ansoff's Growth Matrix

Following Ansoff's Growth Matrix, the local market can be positioned in the "market penetration" block, and the potential African market can be positioned in the "market development" block.

Financial Objectives

Quantities

Current combined annual quantities are approximately 4.6 million m^3. If executed on a 24-hour basis, this will most likely be realised in approximately 7 months, leaving 5 months available for sale.

Market Share

Dredging Services' capability for increased work is approximately 3.2 million additional cubic metres per annum.

Profit

Profitability impacts are encapsulated in
Figure 4.3: Financial Projections.

4.8 Marketing Strategies

Marketing approach

Positioning

Dredging Services needs to position itself as the leading supplier of dredging and Hydrographic survey services in Southern Africa. There is need to capitalise on the more advanced stage of development that South Africa is in, in comparison with most of the Southern African continent.

Communication

Communication must occur on two levels.

Dredging Services must target communication efforts at a specific potential African country.

Service

Dredging Services must adapt their services to make them more attractive to the African market. For example, fixed pipeline reclamation can be replaced with a rainbowing arrangement. As a result of the lack of infrastructure required for this service, it would make it more appealing to countries without reclamation infrastructure, but requiring this service.

Price

When foreign dredgers undertake work on the African coast, a substantial component of their dredging rate comprises of exceptionally high mobilisation costs. This is compounded by the weak nature of most African country's currencies.

Dredging services has the advantage of proximity to the African countries, as well as the weak nature of the South African Rand in comparison with international currencies.

Dredging Services can thus offer a highly competitive service to these African countries, while still ensuring a good profit margin.

Supporting service

Dredging Services has a highly competent Hydrographic survey service, which it offers together with dredging services to local markets.

This same service can be offered to the African market to compliment the dredging activities.

4.9 Projected Profit and Loss

Inclusive of African Markets

Financial Projections

Financials for the period 2003 through to 2006 are listed in
Figure 4.3: Financial Projections below. A projection forward up until the year 2012 is also included.

	2003/2004 Actual Rm	2004/2005 Actual Rm	2005/2006 Actual Rm	2006/2007 Budget Rm	2007/2008 Projection Rm	2008/2009 Projection Rm	2009/2010 Projection Rm	2010/2011 Projection Rm	2011/2012 Projection Rm	2012/2013 Projection Rm
Income	77.562	72.907	63.479	117.389	266.895	251.748	269.271	208.752	205.445	218.866
External	2.529	4.423	19.683	25.650	77.792	81.682	85.766	90.054	94.557	99.285
Intra Port Recoveries	74.586	66.826	42.633	89.064	186.373	167.283	180.665	115.802	107.934	116.569
NPA Cost Centre Recoveries	0.000	0.000	0.000	1.767	1.802	1.838	1.875	1.913	1.951	1.990
Miscellaneous	0.447	1.658	1.163	0.908	0.926	0.945	0.964	0.983	1.003	1.023
Expenditure	64.036	67.317	97.881	90.708	146.893	152.486	181.759	173.403	181.190	190.195
Labour	30.546	32.790	33.524	39.623	42.000	44.520	47.192	50.023	53.025	56.206
Energy	7.607	8.978	9.041	10.901	24.784	20.271	21.682	16.809	16.543	17.623
Material	1.665	0.566	0.427	0.703	1.531	1.444	1.545	1.198	1.179	1.256
Depreciation	2.696	1.869	10.107	8.461	13.382	26.729	47.677	56.018	61.871	63.363
Other	21.521	23.114	44.781	28.968	63.102	59.521	63.664	49.355	48.573	51.747
NPA Cost Centre Charges	0.000	0.000	0.000	2.052	2.093	2.135	2.178	2.221	2.266	2.311
Operating Surplus / Deficit	13.526	5.589	(34.402)	26.681	120.002	99.262	87.511	35.350	24.255	28.672
	17.4%	7.7%	-54.2%	22.7%	45.0%	39.4%	32.5%	16.9%	11.8%	13.1%
Non operating expenditure	2.864	2.651	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Net Surplus/Deficit	10.662	2.938	(34.402)	26.681	120.002	99.262	87.511	35.350	24.255	28.672
Capital Investment	0.540	0.913	1.600	1.707	49.209	133.471	209.479	83.406	58.534	14.921
Capital Investment (Cumulative)	427.818	428.731	430.331	432.038	481.247	614.718	824.197	907.603	966.137	981.059
Income	5.76%	-6.00%	-12.93%	84.93%	127.36%	-5.68%	6.96%	-22.47%	-1.58%	6.53%
External Turnover Increase	85.96%	74.89%	345.02%	30.32%	203.28%	5.00%	5.00%	8.00%	8.00%	8.00%
Internal Revenue Increase	4.17%	-10.40%	-36.20%	108.91%	30.00%	50.00%	8.00%	8.00%	8.00%	8.00%
Miscellaneous Income Increase	18.22%	271.03%	-29.85%	-21.91%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Expenditure	7.70%	5.12%	45.40%	-7.33%	61.94%	3.81%	19.20%	-4.60%	4.49%	4.97%
Labour Increase	10.08%	7.35%	2.24%	18.19%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Energy	-1.26%	18.02%	0.70%	20.57%	127.36%	-18.21%	6.96%	-22.47%	-1.58%	6.53%
Material	138.57%	-65.99%	-24.55%	64.51%	117.83%	-5.68%	6.96%	-22.47%	-1.58%	6.53%
Depreciation	-36.83%	-30.68%	440.79%	-16.28%	58.16%	99.74%	78.37%	17.49%	10.45%	2.41%
Other Ops Cost	13.03%	7.40%	93.74%	-35.31%	117.83%	-5.68%	6.96%	-22.47%	-1.58%	6.53%

Figure 4.3: Financial Projections Adapted from DS Financial Statements

When shown diagrammatically, as reflected in Figure 4-4: Operating Profit % of Turnover, it can be observed that maturity will be reached during the 2022/2023 financial year.

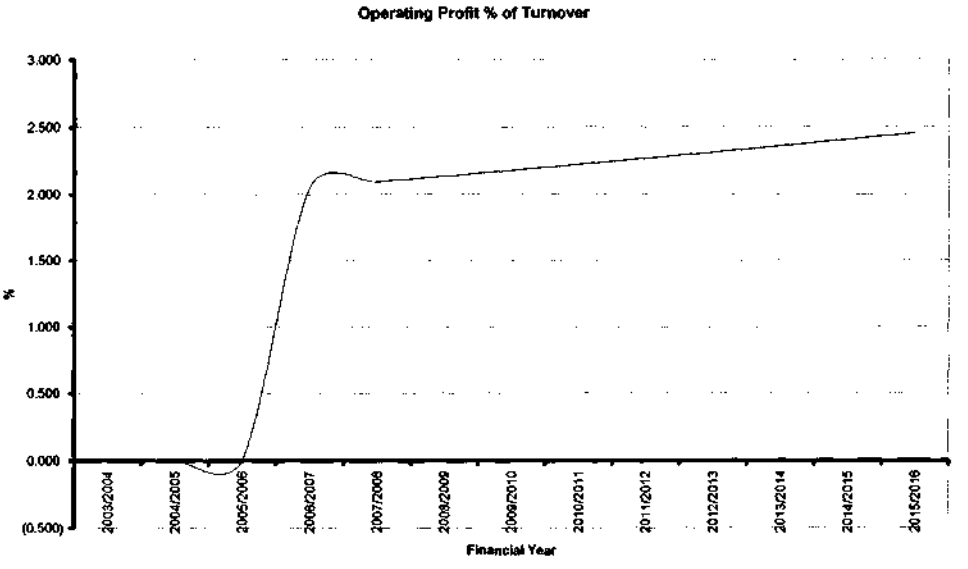


Figure 4-4: Operating Profit % of Turnover

Notes

The projected income for the financial year 2007/2008 reflects an income capability rather than income projected from a definitive source. However, activity based operational expenditure will not increase if none of this new work is performed.

Table 4.9: Production Quantities and Income per Port

Port	Overall Quantity Handled (m^3)	Income	Average Rate (R/m^3)
Durban	1,540,500	R 25,835,463.50	R 16.77
Richards Bay	2,330,600	R 31,720,298.50	R 13.61
East London	550,631	R 11,993,290.51	R 21.78
Port Elizabeth	220,000	R 9,027,761.50	R 41.04
Mossel Bay	50,000	R 1,358,714.85	R 27.17
Totals	**4,691,731**	**R 79,935,528.86**	**R 17.04**

Due to the 80/20 fixed to variable cost relationship that exists in the business, if the fixed costs are completely distributed to the contracted income, the m^3 rate will only increase based on the additional crewing cost that 24-hour working will bring (15% or R5m) less savings from improved operational efficiencies.

These savings could be significant however in view of the fact that the 2006/2007 labour budget of R39.6m includes approximately R3m for Overtime/Sunday Time/Public Holidays some of which will not be applicable in the new method of operation. Furthermore, there will be savings in standby allowances (R18,000), accommodation and refreshment costs (R1m), outlying office rentals (R0.5m), outlying office security (R150,000). Other operating costs should increase by approximately R700,000 due to the additional Travel and Food Costs associated with the 24-hour working arrangement.

Therefore, inclusive of normal inflationary increases, the net effect will therefore be of the order of an increase in Operational Expenses of approx R8m, which when considered against the backdrop of an Overall Handled Quantity of 4.6 million m^3 (refer Table 4.9: Production Quantities and Income per Port) translates to an increase in Dredging Cost per m^3 of R1.74 cents or 10% on average (refer Table 4.10: Production Quantities and Proposed Income per Port).

Table 4.10: Production Quantities and Proposed Income per Port

Port	Overall Quantity Handled (m^3)	Income	Proposed Average Rate (R/m^3)
Durban	1,540,500	R 28,419,009.85	R 18.45
Richards Bay	2,330,600	R 34,892,328.35	R 14.97
East London	550,631	R 13,192,619.56	R 23.96
Port Elizabeth	220,000	R 9,930,537.65	R 45.14
Mossel Bay	50,000	R 1,494,586.34	R 29.89
Totals	**4,691,731**	**R 87,929,081.75**	**R 18.74**

Table 4.11: International Benchmarking Exercise

Source	Dredge Rate (Currency/m^3)	Conversion Factor	Dredge Rate (R/m^3)
Australia	A$ 50 - 100 without disposal costs	4.91837	R245 to R491.84 without disposal costs
Germany	Euro 2.5 to 15	8.30193	R20.75 to R124.53
New Zealand	NZ$ 7 - 55 including disposal	4.32295	R30.26 to R237.76 including disposal
UK, London	US$ 2	7.34233	R 14.68
UK, Southampton	5 Pounds	11.9422	R 59.71
South Africa			**R 17.04**

4.10 Evaluation and Control

Meetings

Operations Meeting

The Operations meeting, which is held on a monthly basis, focuses on operational effectiveness and efficiencies.

EXCO Meeting

The EXCO meeting, which is held on a monthly basis, focuses on business effectiveness and efficiencies. Key Strategic projects and New Business Development opportunities are discussed at this forum.

Conclusion and Recommendations

Local market

Discussions with Port Engineering and the Harbour Masters must result in a clarification of roles. Dredging Services functions as the contractor, and the Harbour Master is the customer. Port Engineering's role must be that of consultant. Consequently the highly abnormal situation where the consultant also controls the purse strings must be rectified.

This is especially necessary in view of Dredging Services vision of "Depth Management", which as a strategy can only target the Harbour Masters, as by its nature in involves the shift of role of Dredging Services towards a holistic solution which incorporates the consultant and contractor role. This shift would not be possible if the control of funds remains with Port Engineering.

Depth Management as a strategy is necessary as it places the control of the capacity that will be generated by operational improvement, at the disposal of Dredging Services, and not its customers. This is vital for the African market initiative.

Market Related Dredging Rates

In view of the eventual positioning of Dredging Services outside the NPA, it is vital for the NPA that the cost of dredging is market related, so as not to result in any undue costs steps in the future.

Window of Opportunity

As the African market develops, the need for dredging develops. Dredging Services should therefore make its existence known on at least an African level.

If it fails to do this, the countries requiring dredging will have one of two other options. Either they obtain some sort of funding to own and operate their own maintenance dredger, or they buy the service in from an international provider.

Dredger Procurement

In the first case, if the country is successful in obtaining funding for its own maintenance dredger, it will become a competitive threat in Africa.

International Provider

In the second case, if an international provider is used, it becomes progressively cheaper for this provider to offer his services to other surrounding countries, as the dredgers mobilisation cost would already have been recovered. This again would represent a competitive threat to Dredging Services.

Alternate Methods

Dredging Services currently utilises a fixed pipeline reclamation arrangement, requiring specific infrastructure.

Three other more modern methods of reclamation are available:

- Rainbowing
- Floating Pipeline
- Sand pumping scheme

Rainbowing

Dredging Services is in the position of being able to equip their current equipment to facilitate rainbowing, with minimal modification. This process appeals to existing customers in that no shore-based infrastructure is required.

This process will also appeal to potential African customers since they do not have existing infrastructure.

Floating Pipeline

Once a vessel has been modified to facilitate rainbowing, a fairly straightforward further modification will enable coupling onto a floating pipeline.

This floating pipeline has significantly lower maintenance costs than a fixed pipeline, and therefore represent an opportunity for improvement by established customers.

In addition, this floating pipeline will reduce Dredging Services' cycle time, in that coupling onto this pipeline does not require the berthing of the vessel, and therefore saves a substantial amount of time. This saved time could be better utilised in creating additional spare capacity, which could then be marketed to other African customers.

The increased profits that will result from this foreign work could be used to subsidise the cost of local dredging. Alternatively, Dredging Services could aid in the funding of the floating pipeline, and offset this cost with the increased foreign revenue.

Sand Pumping Scheme

If Dredging Services fails to increase its revenue by finding other markets, the local dredging rates will continue to climb to fund Dredging Services' operational inefficiency.

Alternative methods of nourishment such as sand pumping will then become viable.

Business Objectives

Figure 4.2: Ansoff's Growth Matrix suggests a market penetration strategy for current markets, and a market development strategy for new markets.

Market Penetration

A market penetration strategy involves endeavouring to gain a larger share of the market in which Dredging Services currently competes with its existing products. This type of strategy is not applicable to Dredging Services however, as the market in which it operates is currently closed.

This offers Dredging Services the advantage of not having any competition, but limits growth potential. The obvious solution is therefore to look elsewhere.

Market Development

A market development strategy involves taking current products to new markets. This strategy offers hope to Dredging Services in that it will enable growth. This growth is necessary for survival.

Alternative

The alternative to growth for Dredging Services is death. The local market cannot sustain Dredging Services' operational inefficiencies for much longer. Unless proactive growth mechanisms pursued, Dredging Services will either be downscaled to improve efficiency (growth possibility lost), or sold off to an international concern (reduced to a fraction of its current scale).

There is therefore no real choice, expand or die.

4.11 Human Capital Development

The purpose of this is to ensure that the right numbers of adequately trained marine and associated resources are available, at the right time as DS positions itself in the external dredging market.

CHALLENGES IN DREDGING SERVICES

As a business, (DS) will be faced with several challenges in meeting its strategic objectives. Whilst not exhaustive, these are, inter alia:

- To implement a 24-hour operation on some dredgers.
- Increase capacity to resource all dredgers to operate on a 24-hour basis.
- To deploy operational resources from a central crewing office.

1. **Business optimization & productivity**

   In the modern world of work and as one of the cornerstones of the ISO QMS, businesses are consistently seeking continuous improvement of processes and the ability to "do more with less" which provides an organization with a competitive edge.

   This is a big challenge for NPA as the requirement entails increasing our efficiency levels to a much higher standard. Our employees are accustomed to operate within a monopolistic environment, with little attention to customer service, competition and technology changes.

2. **Capacity development**

   The rate at which the DS is able to develop employees far exceeds the rate at which employees turn over. However, it takes at least ten years to train a learner from grade 12 to the level of Master Mariner, and eight years to train a qualified artisan to a Chief Marine Engineer Officer level. Furthermore, there is a general shortage of trained marine candidates in the job market.

   The challenge is fast tracking via Learnerships especially in the critical marine deck positions where the duration of training is longer and highly regulated. Learnerships offer the possibility to train unemployed citizens and thereby creating a "pool" of qualified equity candidates.

3. **Succession and retention:**

   The key challenge to the success of any Employment Equity programme is the ability to promote from within and retain the resources which have been developed, often from scratch.

4. **Culture and environment:**

   There is a strong marine culture in DS, but it differs from the marine culture in the rest of the marine industry in so far as that DS's employees are not used to live on board and move around frequently.

Differences in racial and ethnical distribution as per different job categories pose a challenge in national EE-targets.

4.12 Results from Interviews with DS Executive Committee Members

Answers from the questions asked are grouped below;

Q1: What opportunities are available to the business? External business beyond South Africa's borders in Dredging, Hydrographic Survey and Project Management.

Q2: What are the top 3 challenges facing DS as a business? Growing our market share, improving the downtime / reliability of the current fleet and more delegation of authority from top management to the business coal face needs to be implemented.

Q3: Comment on what can be improved in your own department to facilitate DS sustainability? Succession planning needs to be vigorously pursued due to the fact that the skills transfer of the business knowledge takes some time to acquire / impart. HR noted that each line function must take more responsibility to ensure that training and development of staff occurs.

Q4: Comment on what can be done in other departments to facilitate DS sustainability? Roles in each department need to be clearly defined as this then enables line managers to function effectively. The HR department must drive the initiative toward training and developing deck and engineering crew. Acceptance of the Asset replacement plan will allow DS the opportunity to create capacity to venture into new markets and generate external revenue. Better communication between departments is required.

Q5: Is there any other input you have on what needs to be changed in DS to improve? More accountability must be placed on the operational staff as the land based management do not and cannot run the day to day operations form a remote office. De-centralisation of decision making power must be attempted.

The results above indicate that the consensus amongst the management team at DS concur on the path to sustainability i.e. increasing capacity and renewing assets to allow the external revenue to be pursued.

CHAPTER 5: ASSET REPLACEMENT PLAN

The existing Dredging Services Fleet consists of:

Two trailing suction hopper dredgers (TSHD);
PIPER: Class Lloyds Register 100 A1 (Twin-Screw, diesel electric, bow well suction, single side trail pipe, bowthruster) and
INGWENYA: Class Lloyds Register 100 A1 (Twin-Screw, diesel, bow well suction, single side trail pipe, bowthruster),

One grab dredger;
CRANE: Class B.V.I. 3/3E a kort nozzle diesel grab dredger,

One plough tug **IMPISI**;

Three fibreglass ski-boats and one metal hull launch.

TSHD

The trailing suction hopper dredgers are each approximately 110m long with an installed power of approximately 5 MW.

This type of dredger has a 1m-diameter side trail pipe that can be lowered to a maximum depth of 30m, through which it sucks, by means of centrifugal vacuum pumps, sand, silt or mud.

In addition, it is also fitted with a bow pipe (stationary dredging tool) that is used for the purpose of dredging sand from areas such as sand traps etc.

The dredged material is stored in the vessel's hopper, which has a storage capacity of 2830 m^3. The material is then either reclaimed (beach nourishment) or placed at sea.

Grab Dredger

The grab dredger CRANE is approximately 55m long, is fitted with a Liebherr Dredge Crane, and has an installed power of approximately 1.5 MW.

This type of dredger uses a dredge crane with grab to lift material into the hopper.

The dredged material is stored in the vessel's hopper, which has a storage capacity of 500 m^3. The material is then placed at sea.

Plough Tug

The plough tug IMPISI is approximately 25m long and has an installed power of approximately 1 MW.

This type of dredger is also called a bed leveller, and utilises a plough, which it drags on the seabed.

Age of Fleet		
Craft	Year Built	Age as at 2006
Crane	1972	34
Reeve	1985	21
Ingwenya	1981	25
Dikkop	1985	21
Piper	1978	28
Impisi	1972	34
Ingwegwe	1974	32

TABLE 1: Age of Fleet

As can be seen from Table 1, the fleet has a high average age, and will be due for partial replacement in the near future. The high replacement costs associated with this however, render DS's present profitability levels unacceptable, as it will not be in a position to absorb the capital repayments and the high financing costs associated with capital expenditure of the required magnitude.

There is a need for the business to be self sustainable which necessitates undertaking maintenance/capital dredging outside of local waters.

Summary of Strategic Direction required and it's Financial Impact

With additional markets comes additional revenue. With improved operations management, comes relatively lower per unit operational costs. The net effect is improved profitability. Improved profitability facilitates equipment replacement.

The DS strategic direction will therefore be driven by its repositioning strategy and consequent re-engineering efforts. This will result in the generation of marketable spare capacity for sale to new markets, which will result in improved profitability, and thus the ability to replace assets, which will again create further capacity to generate greater external revenue, and hence better profitability."

There is therefore a business requirement to develop an Asset Replacement Strategy, not only to ensure continued availability of existing dredging equipment but also to satisfy the need to establish what the future Fleet requirements are to support the objectives of the business.

Expected changes in technology and best practices

As per the repositioning exercise, Capital Dredging has been identified as a business opportunity. This will require the acquisition/leasing of a Cutter suction Dredger or possibly entering into a joint ventures with those companies that possess such equipment. Dredging Services capital plan makes provision for the acquisition of a new trailing suction hopper Dredger in 2009 as well as a Cutter Suction Dredger in 2012."

OBJECTIVES OF THE ASSET REPLACEMENT PLAN

1. The primary objective is to undertake an economic study, regarding the feasibility of attaining a new dredger using forecasted production requirements for revenue.

2. To develop a Capital plan for replacement of major equipment on the existing Dredgers.

3. To establish current and projected Fleet maintenance expenditure, Availability and Productivity per craft.

4. Benchmarking Exercise

5.1 FINANCIAL FEASABILITY OF ATTAINING A NEW TRAILING SUCTION HOPPER DREDGER

Financial Analysis of investing in a TSHD.

Investment in a 2800m^3 capacity trailing suction hopper dredger: Budget price of €28 million.

The calculation is based on an exploitation period of 20 years.

Assumptions:

A.) Capital Cost:
- An economical life of 20 years for the unit.

B.) Repair & Maintenance Cost:
The values were calculated based on the Dutch (VG Bouw) which is a standard, giving directives for repairs and maintenance costs, and introduced an inflation factor of 5% per year (note: spare parts are included in this figure).

Repair and maintenance costs ranged between €477,000 for the first year and €1.5million for the 20th year.

C.) Fuel and Lubes Cost:
- Dredged material: 50% fine sand, 50% silt (2.5 million m^3 each per year)
- Sailing distance: 10 miles
- Dredging depth: 30 m
- Price of fuel: 300US $/Ton (5%/year for inflation correction)
- Number of worked hours per week: 96 hrs
- Number of worked weeks per year: 33 weeks

The calculated cost takes into account the entire dredging cycle, i.e. trailing, sailing away, discharging, sailing back and restarting the process.

Fuel and lubes costs ranged between € 571,000 for the 1st year and €1.4 million for the 20th year.

D.) Crew and Labour

A crew of 12 employees is sufficient for such a vessel. Allowed for an average annual salary of €25,000/person (R200,000/person), with an inflation correction of 5% per year.

Crew and Labour ranged between €300,000 for the first year and €758,000 for the 20th year.

E.) Overhead Cost

This was taken as 10% of the total costs per year, these costs ranged between €309,000 and for the first year and €534,000 for the 20th year.

F.) Insurance:

The rate of insurance per year is taken based on a pro rata escalation of existing insurance costs with an inflation correction of 5% per year. These costs ranged between €63,055 for the first year and €60,126 for the 20th year. (We currently (2005) pay per annum: R839,000 for Marine Equipment insurance and R480,000 for Marine Liability insurance against a replacement value of R585,707,400.)

RESULTS

- Considering the NPA's required discount rate of 13.8% and revenues of €5 million per year [(≈R40million/yr); assuming dredging 2.5 million m^3 @ €2/m^3, per year], the Net Present Value (NPV) for a 20 year exploitation period is € 2.92 million (≈R23.38 million). This indicated that the project will add value to the business.
- Sensitivity of the result:
  - Revenue: The assumption with the greatest sensitivity is that of the forecasted m^3 to be achieved. A zero NPV (Internal rate of return) is achieved if the m^3 amount decreases from an estimated amount of 2,500,000m^3 to 2,339,500m^3. This indicates that a variance of 6.4% can be tolerated.
  - The calculation is based on an annual inflation figure of 5% which is considered fair.
  - Costs: The calculation is conservative as overheads are taken at 10% of the total costs per year which is more than adequate. A vessel availability of 63% (=33weeks/52weeks) is used which is also conservative as benchmarking exercises indicate that this should be in the region of 70%.
  - A cost saving will also be generated by the reduced crew required to man the vessel.
- The project has an Internal rate of return of 14.89%.
- The payback period is calculated at 9.86 years, with the payback (based on actualised cash values is 7 years.

FINANCIAL ANALYSIS OF INVESTING IN A TSHD

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Investment (-)	-26,000,000																		
Loan from bank (+)	0																		
Repair & Maintenance		-477,000	-513,000	-550,000	-588,000	-628,000	-671,000	-715,000	-762,000	-811,000	-862,000	-916,000	-971,000	-1,030,000	-1,090,000	-1,154,000	-1,220,000	-1,290,000	-1,362,000
Fuel & Lubes		-571,042	-599,594	-629,574	-661,052	-694,105	-728,810	-765,251	-803,513	-843,689	-885,874	-930,167	-976,676	-1,025,509	-1,076,785	-1,130,624	-1,187,155	-1,246,513	-1,308,839
Crew & Labour		-300,000	-315,000	-330,750	-347,288	-364,652	-382,884	-402,029	-422,130	-443,237	-465,398	-488,668	-513,102	-538,757	-565,695	-593,979	-623,678	-654,862	-687,605
Insurance		63,055	62,897	62,740	62,583	62,427	62,271	62,115	61,960	61,805	61,650	61,496	61,343	61,189	61,036	60,884	60,731	60,580	60,428
Overhead		-268,499	-276,470	-284,758	-293,376	-302,433	-312,042	-322,016	-332,568	-343,612	-355,162	-367,234	-379,943	-393,308	-407,144	-421,772	-437,010	-453,080	-469,802
Total Expenses, excluding loan repayment		-1,553,486	-1,641,166	-1,732,342	-1,827,132	-1,926,763	-2,032,467	-2,142,181	-2,258,252	-2,379,733	-2,506,784	-2,639,573	-2,779,378	-2,926,385	-3,078,588	-3,239,492	-3,407,113	-3,583,875	-3,767,818
Total Expenses, including loan repayment (		-1,553,486	-1,641,166	-1,732,342	-1,827,132	-1,926,763	-2,032,467	-2,142,181	-2,258,252	-2,379,733	-2,506,784	-2,639,573	-2,779,378	-2,926,385	-3,078,588	-3,239,492	-3,407,113	-3,583,875	-3,767,818
Depreciation of Asset (C)				-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000	-1,400,000
Revenues (R)				5,512,500	5,788,125	6,077,531	6,381,408	6,700,478	7,035,502	7,387,277	7,756,641	8,144,473	8,551,697	8,979,282	9,428,246	9,899,658	10,394,641	10,914,373	11,460,092
Profit (before tax) (P)	equals R+C+A	2,046,514	2,208,834	2,380,158	2,560,993	2,750,768	2,948,941	3,158,297	3,377,250	3,607,544	3,849,857	4,104,900	4,372,318	4,652,897	4,949,658	5,260,166	5,587,528	5,930,497	6,292,274
Cash Flow (CF)	equals R+B	3,446,514	3,608,834	3,780,158	3,960,993	4,150,768	4,348,941	4,558,297	4,777,250	5,007,544	5,249,857	5,504,900	5,772,318	6,052,897	6,349,658	6,660,166	6,987,528	7,330,497	7,692,274
		3.45	3.61	3.78	3.96	4.15	4.35	4.56	4.78	5.01	5.25	5.50	5.77	6.05	6.35	6.66	6.99	7.33	7.69
Cumulative Cash Flow	-26.00	3.45	7.06	10.84	14.80	18.95	23.30	27.85	32.63	37.64	42.89	48.39	54.17	60.22	66.57	73.23	80.22	87.55	95.24

Cant: 2.5 million m^3 @ €2/m^3, escalated at 5% per annum

10 DCF-NPV @ 10% PER YEAR 13.13 million euros
13.8 **DCF-NPV @ 13.8% PER YEA 2.92 million euros**
15 DCF-NPV @ 15% PER YEAR 0.51 million euros

Return on Equity (ROE) **IRR (percent =** **14.89 %** *Is the % at which NPV= 0.*

Payback = **9.86 years** *The shorter the repayment term the lower the risk.*

Payback (based on actualized cashflow v:= **7 years**

	-2,684,987	-2,764,697	-2,847,584	-2,933,757	-3,024,330	-3,120,424	-3,220,165	-3,325,684	-3,436,121	-3,551,622	-3,672,339	-3,799,435	-3,933,077	-4,071,443	-4,217,720	-4,370,102	-4,530,796	-4,698,016

Notes:
Figures in Euros
Inflation at 5% per annum
Exchange rate at R8/€
NPA discount rate of 13.8%

Results
Considering NPA's discount rate of 13.8% and revenue projections based at 2.5million m^3 @ € 2/m^3 per year (escalated at 5% per annum),
the Net Present Values (NPV) for a 20 year 2.92 million euros R 23.38 million), indicating that the project will add value to the business.

5.2 PLAN FOR REPLACEMENT/IMPROVEMENT OF MAJOR EQUIPMENT ON THE EXISTING DREDGERS

5.2.1 Dredge Equipment (Minor works i.e. <R250,000.00)

	Dredge Pumps	DC motors	Hydraulics	Dredge Instrumentation	PLC Controls	Gantrys
2007					Ing:DV units. Piper: Flow meter (1)	
2008	Piper: Higher η pumps (2)		Ing. Blocks (2)	Digital gauges for Ing/Piper	Ing: Flow meters (2). Piper: Production gauges	Ing: Side trail winch motors (3)
2009			Ing. pressure pumps (3)			
2010						
2011		AC motors with Variable speed drives				

5.2.2 Process Equipment

2008		ARPA Radars for Piper/Ing (1ea)				Piper
2009	Ing: new engines (2)	ARPA Radars for Piper/Ing (1ea)		Piper/Ing: Wireless comms	Piper/Ing: PLC system for steering control,engine speed, alarms	
2010	Piper/Ing: new engines (2)		Piper: Steering gear	Piper/Ing: Radios/GMDSS		Crane

5.2.3 30 Year Asset Replacement Plan (Major Capital Expenditure Projects)

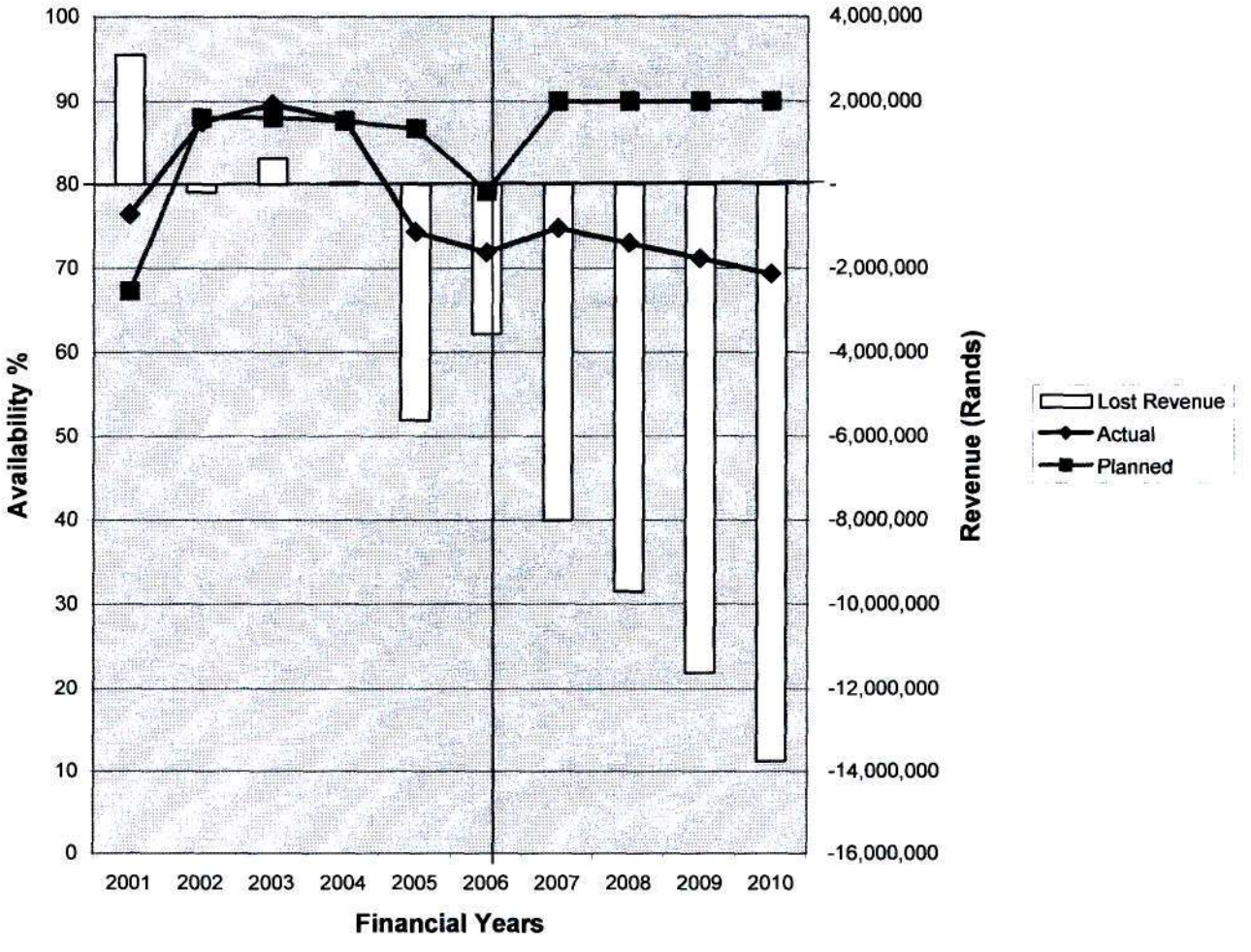
	Major Projects	
2007		
2008	Process Equipment Upgrade for the Dredger Ingwenya (R60million)	
2009	Overhead Crane: Ingwenya (R100k)	
2010	New Trailing Suction Hopper Dredger 4000m3 (R450m)	Mods on Crane: DOP Pumps to enable cutter work etc (R1m)
2011		
2012		
2013	New Cutter Suction Dredger (R50m)	
2014	CRANE replacement (R100m)	
2019	Replacement for TSHD Ingwenya R500million	
2036	Replacement for 4000 m3 TSHD Ingwenya R1504 million	

Motivation for replacing the Dredger Piper with a new TSHD;

- As indicated above, the financial calculations indicate that the proposal is financially feasible, with attractive Net Present values and payback.
- The Piper has a higher degree of obsolescence due primarily to the lack of spares for now obsolete DC motors, which drive both the pumps and propellers. The Original Equipment Manufacturer (Siemens) has indicated the lack of spares will be aggravated by their decommissioning of plants in Germany used to manufacture critical DC control components. The effects of this obsolescence are increased breakdown times and lay-ups, which negatively affect craft availability.
- The Piper is 4 years older than the Ingwenya. An independent technical audit completed (end 2001) on this vessel indicated that the craft had approximately 8.5 years of operating life remaining (working 12 hrs/day). As at end 2006 the remaining life would be 3.5 years. The replacement dredger is planned to be in operation approximately one year before this time would have elapsed.

- The Piper has higher noise levels while operating, which is not conducive to working on a 24 hour basis.
- The Piper being a Diesel Electric Vessel (Ingwenya is a Direct Diesel Vessel) contains more complicated prime movers. The skills required to operate the Ingwenya successfully are thus more readily available than those required for the Piper.
- The costs to upgrade the electrical/electronic components of the craft are significantly higher, compared to the Ingwenya.

Graph 1: Dredger Piper Availability



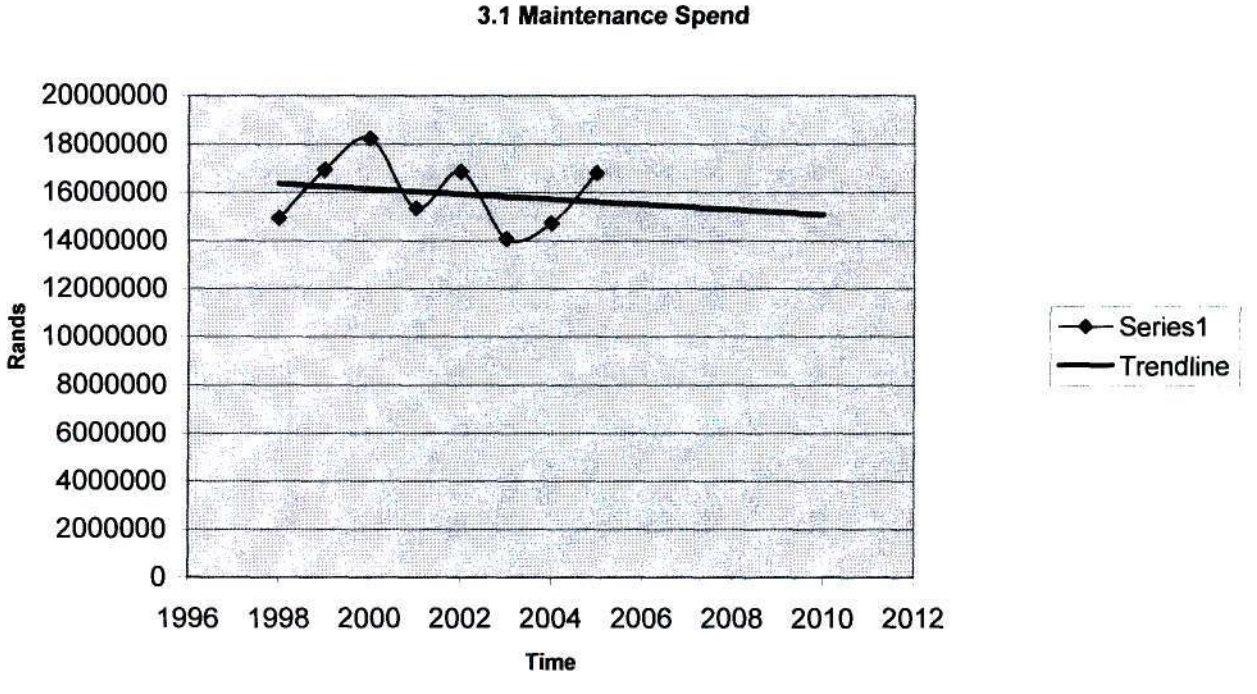
- The graph above illustrates the actual vs planned Availability figures for the Dredger Piper (actual figures up to 2006) and the lost revenue that can be attributed to any deviation. From 2006 onwards, the forecasted availability is

compared against a planned figure of 90%, which a new TSHD would be able to achieve (cumulative lost income, 2006-2010 approx R50mill).

- The negative trend in availability results in the shortfall of income as illustrated by the bar graph. It must be noted that the 2006 figures used are year to date.

5.3.1 Current maintenance expenditure.

As indicated in the table below the maintenance expenditure per annum is shown to be cyclical in nature with the linear trend line showing a decreasing trend over the last five years. The last three financial years however show an increasing maintenance cost per year. Refer to Section 4. Benchmarking Exercise for further discussion.



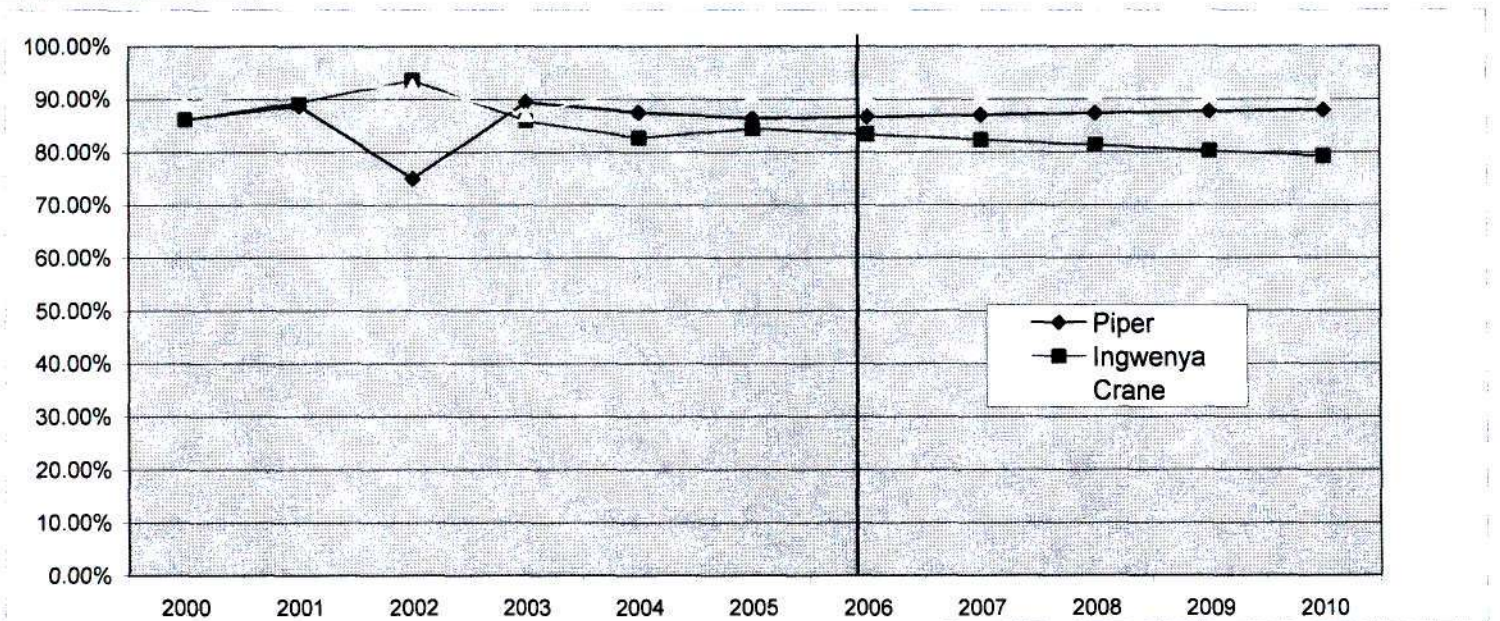
DESCRIPTION	Total Costs Over 6 Year Period R	Year 1999 R	Year 2000 R	Year 2001 R	Year 2002 R	Year 2003 R	Year 2004 R	Year 2005 R
REPAIRS & MAINTENANCE								
ACCIDENT REPAIR COSTS	7,376,266	424,458	2,687,958	2,725,068	148,180	712,057	358,691	319,853
REPAIRS & MAINTENANCE	31,908,920	4,371,503	5,225,897	5,143,303	4,478,292	4,369,310	4,234,978	4,085,637
LAY UP REPAIRS	71,411,283	10,149,527	9,035,634	10,312,171	10,529,671	11,786,710	9,494,877	10,102,693

5.3.2 Availability and Productivity per Asset (Piper, Ingwenya, Crane)

5.3.2.1. Availability per Craft

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Piper	86.23%	88.86%	75.05%	89.49%	87.55%	86.42%	86.74%	87.07%	87.40%	87.73%	88.05%
Ingwenya	86.18%	89.43%	93.64%	85.92%	82.72%	84.45%	83.41%	82.36%	81.32%	80.28%	79.23%
Crane	89.41%	92.07%	92.61%	87.15%	92.11%	90.81%	90.86%	90.91%	90.96%	91.01%	91.05%

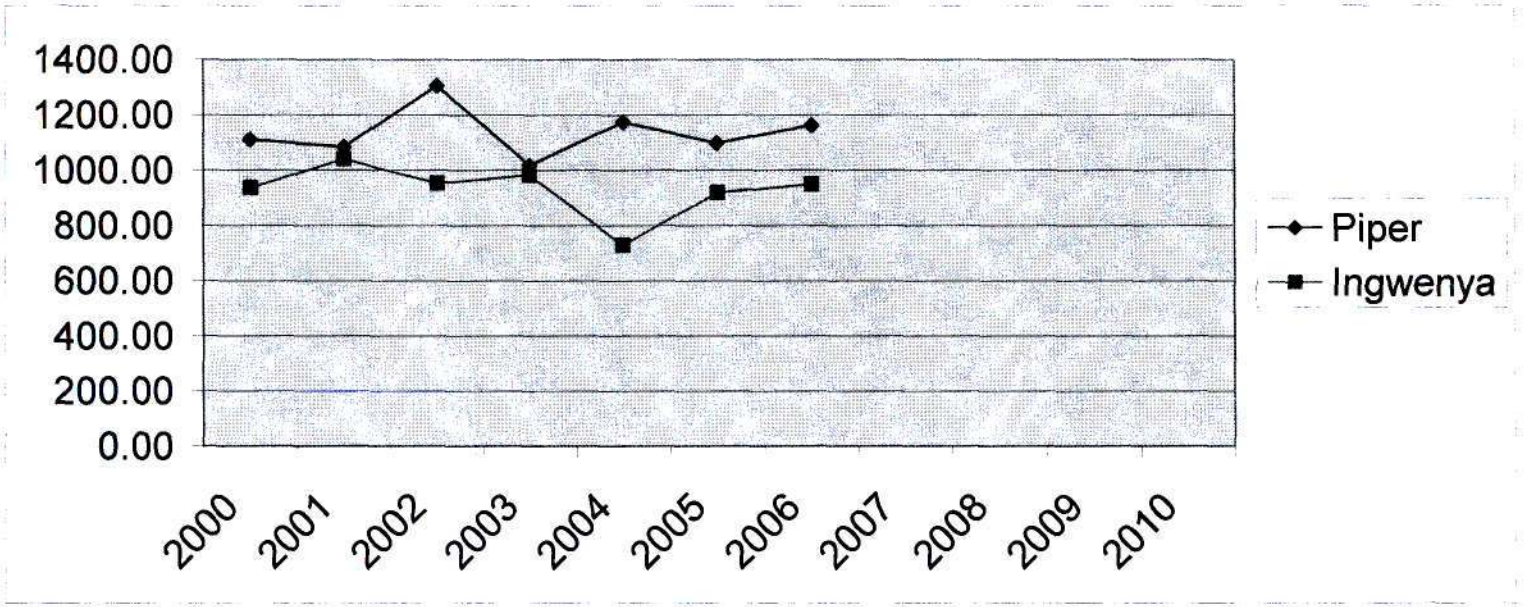
Average	**2000-2006**
Piper	85.76%
Ingwenya	86.54%
Crane	90.72%



5.3.2.2 Productivity per Craft

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Piper	1113.15	1086.31	1307.17	1019.15	1175.86	1100.00	1163.63				
Ingwenya	937.39	1040.30	953.84	983.12	730.31	920.00	950.00				

Average	**2000-2004**
Piper	1140.33
Ingwenya	928.99



5.4 Benchmarking Exercise

(Maintenance Expenditure/Utilisation/Price charged per m^3)

AS PER INTERVIEW WITH IHC Representative : Area Manager for Africa, Mr Jean Maari (August 2004)

Allow 4 weeks per year for Running Maintenance.

- 2 weeks per year for Layup (new vessel).
- Utilisation target of 80%, Actual between 65-70%.
- A vessel must work 280-300 days/year to be profitable.
- The maintenance cost per year of a new dredger is approximately 10% of the Dredger's cost price.
- A new vessel has an initial expenditure per m^3 of $\$2/m^3$.
- The cost of 1 m^3 per vessel including crew, maintenance and overheads should be $\leq \$1{,}50/m^3$ ($\approx R9/m^3$). If it is greater than this implies that the equipment requires replacement.

Prices charged by External Contractors:
$\$4/m^3$ in **Mozambique** for sand.
$\$3.5/m^3$ for gravel and coarse sand.

Egypt: $\$2.5\text{-}3/m^3$.

AS PER INTERVIEW WITH ROHDER NIELSON: Mr Garreth Pollit (June 2004)

Asset replacement should depend on the useful life of dredge equipment, **hull**, propulsion efficiency, and fuel consumption.

Running maintenance: (x2 in year 1 of vessel life, then 50% of current maintenance cost)

Examples from Rohder Nielson Fleet

'New Dredger' (6 years old)

(3900 m^3 trailer)

Operating Expenditure :	£ 176,000	Running maintenance
	£ 125,000	Dry Docking
Capital Expenditure	£ 300,000	
TOTAL	**£ 601,000 ≈R6,611,000 (@11R/£)**	

Dolphin : 1986

(2100 m^3 trailer)

Operating Expenditure	£ 146,000 Running maintenance (≈R1.6m)
	£ 144,000 Dry Docking (≈R1.584m)
Capital Expenditure	£ 0
TOTAL	**£ 290,000 ≈R3,190,000 (@11R/£)**

Marlin : 1993

Operating Expenditure	£ 168,000 Running maintenance
	£ 132,000 Dry Docking
Capital Expenditure	£ 72,000
TOTAL	**£ 372,000 ≈R4,092,000 (@11R/£)**

TOTAL MAINTENANCE for Fleet : 3 trailers, 1 bed leveller, 1 Grab dredger, 9000 Hopper Capacity

42%	General Maintenance
37%	Docking
15%	Replacement
6%	(Sand)

£1.5 million pounds for Maintenance

Dredging Services Comparison

2005/2006	DS		Rohder
ACCIDENT REPAIR COSTS	319,853	2%	0%
REPAIRS & MAINTENANCE	4,085,637	26%	42%
LAY UP REPAIRS	10,102,693	65%	37%
STRUCTURES	227,278	1%	0%
REPLACEMENT/CAPEX	736,873	5%	15%
TOTAL MAINTENANCE	15,472,334		

DISCUSSION

- It is evident that an area for improvement is to better plan and increase Dredging Services Capital Expenditure. It is interesting to note the much higher % spend by Rohder on 'running' maintenance.
- For Rohder Nielson the Maintenance expenditure per craft varies from R3.19 million to R6.6 million. A TSHD similar to Dredging Services has an expenditure of R3,19 million. This compares to a Dredging Services TSHD maintenance spend of approximately R5.4 million. Although the Rohder dredger has a smaller hopper capacity, the difference between the two figures indicates our maintenance expenditure per craft is excessive. This figure should be in the region of between R3.5 million and R4.0 million. It must be borne in mind that the maintenance strategy that Rohder employs for this craft is not known, and it could be that the maintenance spend on this craft is at a minimum to keep the craft operational.
- Piper: Maintenance+Crew&Oheads+Fuel/m^3 handled $\approx$ (6+9.5+4.8)/1.8=R11.20/m^3, which is higher than the recommended R9/m^3. However we are currently not working 24 hr shifts which would change the ratio to approx=(1.4*6+1.3*9.5+2*4.8)/(2*1.8)=R8.43/m^3 which is more in line with the norm, as per the IHC representative.

CONCLUSION

Dredging Services needs to re-engineer itself to be a sustainable business unit with the focus being on new revenue opportunities.

A mid term goal should be to improve operations management through working 24 hour shifts to create capacity for new work, while the longer-term strategic direction is for the business to change from being purely a maintenance-dredging provider to a commercial entity. This will necessitate expanding/improving the Dredging fleet to accommodate this.

The strategy has outlined that the purchase of a new TSHD is financially feasible as well as the development of Capital and Operational expenditure plans for the future.

CHAPTER 6: RECOMMENDATIONS AND CONCLUSION

Recommendations and the way forward to tackle the strategic direction, with associated timelines, are included.

With the present operational arrangements, the fleet capacity has been fully absorbed by the annual maintenance dredging requirements of the various client ports. DS has however on occasion executed some small dredging work for external clients.

The fleet has a high average age, and will be due for partial replacement in the near future. The high replacement costs associated with this however, render the present profitability levels unacceptable, as DS will not be in a position to absorb the capital repayments and the high financing costs associated with capital expenditure of the required magnitude.

The case for repositioning has been shown to be exceptionally strong, and the necessity absolute, if DS is to exist as a sustainable business unit in the future. Additional markets must be sought. These could include markets external to the NPA or even external to South Africa. The capacity generated by improved operations management, must be actively marketed.

Summary of Strategic Direction required and it's Financial Impact.

With additional markets comes additional revenue. With improved operations management, comes relatively lower per unit operational costs. The net effect is improved profitability. Improved profitability renders equipment replacement strategies feasible.

The repositioning of DS must focus on improved operations management, which will result in greater capacity to pursue new markets, which will result in improved profitability, and thus the ability to replace assets, which will again create further

capacity to generate greater external revenue, and hence better profitability. The "profitability cycle" unfolds.

Repositioning is critically necessary to ensure survival and to position dredging services as a competitive player in the global market. The dredging services business unit of the future, should position itself as a global dredging specialist, which offers flexibility in providing expert dredging solutions.

Various opportunities below are analysed prioritised based on the most realistic implementation timeframes and anticipated strain on available resources. It is recommended that the recommendations contained herein be adopted, subject to the presentation of the respective business cases at the appropriate time.

The purpose of repositioning as discussed has been to account for;

- The changed future of the ports industry.
- The profitability and sustainability imperative
- The need for a sound capital program and investment performance targets.

and to;

- position Dredging Services competitively in the market and increase market share through the identification of viable business opportunities that can be pursued over the next 5 years.
- achieve optimum resource utilization.
- take cognizance of the impact of the draft Ports Bill on the provision of dredging services

The approach used to achieve this objective has included:

- Analysis of "As Is" situation.
- PESTLE analysis.
- SWOT analysis.

- Identification of Key Challenges.
- Identification of Quick Win and Future strategies.
- Identification of repositioning opportunities and analysis to select viable options for the future, which will expand DS's market.

If implemented then Workshops will have to be held to solicit inputs from all levels of the business unit and to get management buy-in.

The primary objective of this Chapter is to recommend viable opportunities that DS can pursue in the future.

To implement the recommended options successfully, requires Management intervention to assure employee buy-in to achieve success in repositioning Dredging Services.

To identify viable alternatives, a comprehensive PESTLE and SWOT analysis was done which highlighted the environmental factors that have to be taken into account. This also indicated to Dredging Services the areas of specific strengths that could be leveraged and opportunities that could be further pursued – the repositioning opportunities were therefore a direct result of this exercise.

2. REPOSITIONING OPPORTUNITIES

The PESTLE and SWOT analysis lead to the identification of various repositioning opportunities.

To determine the viability, timing and sustainability of each of the above options, a more detailed analysis was done for each of the opportunities, by rating each according to a set of criteria (as listed in Chapter 2) to determine the demand and attractiveness, the investment impact, the risk as well as impact on training, resources and systems. The weights assigned were as follows:

Measure	Criteria considered to determine measure	Weight (%)
Market Demand	• Frequency • (New) Revenue opportunities • Historical and future growth potential	30
Market Attractiveness	• Competitiveness in this market (i.e. other players) • Barriers to entry • Price sensitivity • Competitive advantage (i.e. of dredging services in this market)	20
Investment Impact	• The investment needs to enter this market	15
Risk	• The level of risk attached to entering this market	15
Resource Impact	• The impact on dredging resources in terms of both numbers and skills	10
Training Impact	• Whether specific training is required to enter this market	5
Systems Impact	• Whether new/existing systems could be utilised	5

Figure Reproduced from Chapter 2

This process and concomitant ratings, informed the recommendations as included in this chapter. The opportunities identified all have a direct contribution to the future positioning of dredging services.

The opportunities identified and individual analysis according to the criteria is as follows:

2.1 Maintenance dredging in Africa and Internationally

To maintain the promulgated depths of various sections of commercial ports, differentiated between the African port market and the international port market.

Aspect	AFRICA (2.1 a)	INTERNATIONAL (2.1 b)
Market Demand:	Definition of market: Includes all African ports plus islands	Definition of market: Includes international ports across the world excluding Africa
Frequency	Low-Medium (Duration of contract would be long)	Low (distance from locations)
Revenue	High (US currency)	High (US currency)
Historical Growth	Medium-High (linked to development of African ports)	Low-Medium Growth opportunities were considered less in the international arena due to developed ports (Europe, USA, etc) which all have their own dedicated dredging arrangements
Future Growth Potential	(Refer to table indicating potential dredging opportunities at African ports)	
Market Attractiveness: Market Competitiveness	Medium – the African market is more accessible than international	High – international companies exist
Barriers to Entry/ Exit Price Sensitivity	Capex: Medium – existing equipment can be used Resources: Low – utilize existing Legal: Low – no specific legal hurdles exist	Capex: High – would probably require setting up a base overseas to be close to opportunities and require a new dredger to be acquired Resources: Low – utilize existing Legal: Low – no specific legal hurdles exist
Competitive Advantage	High, based on : • Proximity to certain African ports – Destination from ports (movable base?) • Reliability of service delivery • Nepad/ SADC Relationship which may result in other ports giving preference to dredging assistance from SA	None – there is a strong international group of companies with which dredging has to compete
Investment Required Capex Operational	Medium (movable base) High (70% base)	High (new dredger) High (operational impact of base overseas)
Risk	Medium: • Local Demand • Unknown conditions (e.g. material, open seas; insurance, flood)	High: • Unknown conditions (e.g. material, open seas; additional insurance, flood)
Resources:	Navigation: Low (can utilize marine resources) Dredging: Medium (existing dredging resources)	Navigation: Low (can utilize marine resources) Dredging: High (would require additional resources)
Systems	Low (existing)	Low (existing)
Training	Limited additional training required - Medium	Very High

2.2 Capital Dredging

To provide dredging services where port construction/expansion takes place, differentiated based on whether (1) new equipment (i.e a dredger) would be required or (2) whether existing dredging equipment could be utilised).

Aspect	NEW MARKET/ NEW EQUIPMENT (2.2 a)	NEW MARKET/ EXISTING EQUIPMENT (2.2 b)
Market Demand:	Definition of market: new ventures – new ports and expansion of existing ports	
Frequency	Medium/ High	Medium/ High
Revenue	Medium/ High	Medium/ High
Historical Growth	Medium/ High	Medium/ High
Future Growth Potential	Medium/ High	Medium/ High
	The above assessment is based on the fact that new ports and port expansions happen on a consistent basis and would create opportunities to become involved, however, new equipment and resources would need to be provided.	The above assessment is based on the fact that new ports and port expansions happen on a consistent basis and would create opportunities to become involved, however, current equipment and resources could be utilized.
Market Attractiveness:		
Market Competitiveness	High (have to compete with international companies)	High (have to compete with international companies)
Barriers to Entry/ Exit	Capex: High (require new equipment) Resources: High – choice of service providers available and would require potential additional resources)	Capex: Medium (could utilize existing equipment) Resources: Low (existing resources utilized)
Price Sensitivity	Medium (dredging skills can compete and price not always lowest selected)	Medium (dredging skills can compete and price not always lowest selected)
Competitive Advantage	Low – not currently provided	Medium (skills and capacity exist)
Investment Required		
Capex Operational	High (new dredger) High (new costs to operate/man)	Medium (existing) High (70 % base)
Risk	High – lack of resources, skill, experience	Medium to High
Resources:	High	Medium for Dredging skills Low for Navigation skills
Systems	Low (existing)	Low (existing)
Training	High (would require additional resources)	Medium (existing)

2.3 Consultancy – Africa and internationally, including training

Providing expert advice regarding port dredging, dredging operations, and training.

Aspect	Consultancy
Market Demand:	
Frequency	High (based on the opportunities that exist in the market for dredging – it is foreseen that with port development and construction of new ports, that a real opportunity exists).
Revenue	High (consulting fees can be earned)
Historical Growth	Medium (consistent demand for this service, linked to the development of ports/new ports)
Future Growth Potential	Medium (the development of ports/new ports are considered to be consistent)
Market Attractiveness:	
Market Competitiveness	Very High (there are a number of international consulting firms)
Barriers to Entry/ Exit	Low – Reputation could be barrier as SA dredging not known internationally as a consulting company)
Price Sensitivity	Low – Medium (quality and not price is considered to be more important)
Competitive Advantage	Medium NPA is known Portcon is established, i.e. dredging may be able to enjoy an advantage being known as linked to NPA and with support from PORTCON
Investment Required	
Capex Operational	Low Low (no investment is required for this and marginal increase foreseen in operational expenditure)
Risk	Low (new offering at low cost)
Resources:	Low (existing)
Systems	Low (existing)
Training	Medium (some training required)

2.4 Depth Management to ports

Marketing a depth solution to ports that includes hydrographic and dredging services to ensure the promulgated depths of ports. This includes therefore the measuring, planning and execution of dredging operation as a one-stop service to ports)

Aspect	LOCAL PORTS
Market Demand:	
Frequency	High (dredging is done on a consistent basis for all ports and this service is an extension of existing product offering)
Revenue	Medium (the current revenue stream can be enhanced by providing this comprehensive service)
Historical Growth	Medium (consistent work environment)
Future Growth Potential	Low and consistent (ports require a consistent amount of work with no huge growths anticipated)
Market Attractiveness:	
Market Competitiveness	Low (no other potential providers of this service)
Barriers to Entry/ Exit	Low - strongly positioned as only service provider
Price Sensitivity	Medium – this will mean that dredging will have to negotiate a price to provide this service
Competitive Advantage	High Expertise Experienced, this is based on the fact that dredging has the resources, experience and is the only potential provider
Investment Required Capex Operational	Low Low (no additional investment or costs)
Risk	Low - Medium (taking on larger responsibilities)
Resources:	Low – knowledge and skill exists
Systems	Low (existing)
Training	Medium – honing in on consultative support

2.5 Provide Developed Skills – equipment and human resources

Marketing excess equipment and/or human resource capacity, three categories :

(1) Making available dredging equipment to be used elsewhere

(2) Making available hydrographic equipment to be used elsewhere

(3) Making available resources to be utilised on dredging projects elsewhere

Aspect	EQUIPMENT Dredging (2.5 a)	EQUIPMENT HYDROGRAPHIC (2.5 b)	RESOURCES (2.5 c)
Market Demand:			
Frequency	Medium - High	High (local demand)	Medium (High utilisation)
Revenue	Low / Medium	Low/ Medium	Low/ Medium

Historical Growth Future Growth Potential	Low Low – consistent The above assessment is based on the fact that existing equipment can be utilized, that some demand exist where other ports may wish to lease a dredger for work in the port	Low Low – consistent Based on the fact that similar equipment may be bought and that hydrographic equipment not unique in SA	Medium Medium (human demand) Based on the fact that this will require that resources may be taken away for long periods and may cause pressure locally
Market Attractiveness: Market Competitiveness Barriers to Entry/ Exit Price Sensitivity Competitive Advantage	 Medium Medium Medium Low The market exists, but the cost factor may be high to make equipment available, plus the fact that newer equipment may be leased by other companies	 Low (freely available) Low Medium Low This type of equipment is freely available	 Medium Medium Medium High The resources to do the work are limited in SA and NPA probably employs the bulk of such resources
Investment Required Capex/Operational	Low (use existing fleet)	Low (use existing equipment)	Low (resources available)
Risk	High (other parties in the market)	High (other parties can acquire equipment)	Low (existing)
Resources:			High (current skilled)
Systems			Medium (knowledge – need s to be transferred)
Training			Low (limited training required)

2.6 Submerged Foreign Object Recovery

Recover foreign objects on the seabed as an alternative to making use of diving services (Divers perform this function annually for the Port Engineer).

Aspect	
Market Demand:	
Frequency	Low (once/twice a year)
Revenue	Low - Marginal
Historical Growth	Low and Unstable

Future Growth Potential	Low and Unstable The frequency of this type of service is very low on an annual basis and revenue potential limited)
Market Attractiveness: Market Competitiveness Barriers to Entry/ Exit Price Sensitivity Competitive Advantage	 Speed of delivery/ combine with depth management Low High (Cost of divers vs dredging) Low This type of service is normally performed by divers and therefore sensitive ito margins and costs
Investment Required Capex Operational	Low – existing
Risk	Low – simple type of operation
Resources:	Low – existing
Systems	Low – existing
Training	Low - existing

2.7 Dredging and surveying of Dams

Providing a dredging and hydrographic surveying service to Department of Water Affairs and other clients.

Aspect	
Market Demand:	
Frequency	Low - Medium
Revenue	Low – Medium
Historical Growth	Low
Future Growth Potential	Low A local need exists, but the only potential customer, the Department of Water Affairs, does not appear to be able to find the funds necessary to pay for this work.

Market Attractiveness:	
Market Competitiveness	Low
Barriers to Entry/ Exit	Low
Price Sensitivity	High
Competitive Advantage	Low Dredging probably has little competition if this service offered, but has to take into account the revenue vs cost of moving equipment and resources to a site for this type of service
Investment Required Capex Operational	Low (use existing equipment)
Risk	Low (no great competitors or other risks)
Resources:	Low (existing)
Systems	Low (existing)
Training	Low (skilled resources)

2.8 Hydrographic Surveys – Africa and International

Providing hydrographic surveying services to clients, differentiated between the African and International market.

Aspect	AFRICA (2.8 a)	INTERNATIONALLY (2.8 b)
Market Demand:		
Frequency	Medium	Low
Revenue	Medium	Medium
Historical Growth	Low	Low
Future Growth Potential	Medium	Medium
	There is a market for this service, and if offered, would probably attract a consistent amount of work	It may be unlikely that SA resources would provide this service internationally

Market Attractiveness:		
Market Competitiveness	Low	Low
Barriers to Entry/ Exit	Low	Low
Price Sensitivity	High	High
Competitive Advantage	Low There are limited other companies offering this service, but price will play a role	Low Although dredging may get involved internationally, other companies may already be in this market and more price competitive
Investment Required Capex Operational	Low (no investment)	Low – Medium (some additional equipment may be required)
Risk	Low – Medium (Risk to equipment will always be an issue, but sufficient capacity currently exists to minimize business continuity risks)	Medium – High (uncertainty)
Resources:	Low – Medium (existing)	Medium (resources would be away and create pressure in SA)
Systems	Low (existing)	Low (existing)
Training	Low (none required)	Low (none required)

2.9 Usability of Dredging Process By-products

Investigate opportunities of utilising dredging by-products for different purposes and profits.

Aspect	
Market Demand:	
Frequency	High
Revenue	Medium
Historical Growth	Medium
Future Growth Potential	Medium Dredging provides for a consistent availability of by-products, which can be used in other ventures. In essence, an investment will be required for this type of service.

Market Attractiveness:	
Market Competitiveness	Low
Barriers to Entry/ Exit	Low
Price Sensitivity	High
Competitive Advantage	Low There is no such service in SA at the moment. The investment and other costs may however price this service to be expensive.
Investment Required Capex Operational	Medium – High (Sand Drying plant would be required)
Risk	Low (investment and competition considered small)
Resources:	Low (can utilize local resources)
Systems	Low (existing)
Training	Low (labour could be found locally)

2.10 Beach Nourishment

Sand deposit on beaches where sand bypass systems are not installed.

Aspect	
Market Demand:	
Frequency	Medium
Revenue	Medium – High
Historical Growth	Low
Future Growth Potential	Medium
	Nourishment of beaches is seen as a realistic and consistent opportunity due to the vast number of coastal cities and beaches in the African market. It is considered to be able to create a fairly consistent demand if the service was offered.

Market Attractiveness: Market Competitiveness Barriers to Entry/ Exit Price Sensitivity Competitive Advantage	 High High Low – Medium High Dredging has the equipment and mobility to serve any beach with minor modification. This makes dredging competitive and price is not seen as a major prohibitive factor.
Investment Required Capex **Operational**	Medium (Modifications required to equipment for rain bowing[1])
Risk	Medium – High (Close proximity to shore[2])
Resources:	Low (existing)
Systems	Low (existing)
Training	Low (skills exist)

6.2 Analysis of Opportunities

Annexure A contains the detail ratings for the opportunities as listed above. The analysis provided the following results :

Opportunity	Rating	Position
2.4 Depth Management to ports	4.45	1 of 16
2.3 Consultancy – Africa and internationally, including training AND 2.5 (c) Provide Developed Skills – resources	4.40	2 of 16
2.9 Usability of Dredging Process By-products	3.85	4 of 16
2.8 (a) Hydrographic Surveys – Africa	3.75	6 of 16
2.7 Dredging and surveying of Dams	3.70	7 of 16

[1] Rain bowing in an alternate mechanism to place sand on a beach, by pumping it through an upwardly inclined pipe nozzle, and thus enabling the spraying of the material onto the beach.
[2] The rain bowing method requires the vessel to be between 30 – 40 m of the shore.

2.1 (a) Maintenance dredging in Africa	3.55	8 of 16
2.10 Beach Nourishment	3.45	9 of 16
2.5 (b) Provide Developed Skills – Hydro equipment	3.40	10 of 16
2.2 (b) Capital Dredging (existing equipment)	3.30	11 of 16
2.6 Submerged Foreign Object Recovery	3.00	12 of 16
2.5 (a) Provide Developed Skills – Dredging equipment	2.90	13 of 16
2.8 (b) Hydrographic Surveys – International	2.70	14 of 16
2.2 (a) Capital Dredging (new equipment)	2.50	15 of 16
2.1 (b) Maintenance dredging Internationally	1.60	16 of 16

3. Recommendations

3.1 The repositioning of Dredging Services is viewed as an exercise comprising two initiatives. The first initiative should involve the pursuance of immediate quick wins and improved operational strategies, and the second initiative involves the identification of repositioning opportunities, subsequent analysis and finally, planned implementation of selected opportunities.

The successful implementation of quick wins/improved operational strategies will result in partial improvement of profitability, as well as improved resource utilisation and thereby create additional resource capacity. The freeing up of resources is a critical factor that will enable Dredging Services to pursue repositioning opportunities (i.e. new business).

QUICK WIN STRATEGIES TO BE IMPLEMENTED (1-2 YEARS)

Objective: *Port Elizabeth 2007/8 Working Strategy*

Initiative: **Introduce 24-hour working on away campaigns where weather conditions are favourable e.g. Port Elizabeth (as a learning exercise). Improve utilisation of staff during away trips.**

Positives	Negatives	Benefits
• Work can be completed in shorter time. • Better utilisation of resources, including staff. • Better understanding of 24-hr working. • Additional capacity to complete Richards Bay work.	• Potential resistance from labour. • Cost to upgrade craft. • Learning curve (reduced production at night). • Increased maintenance costs to craft.	• Optimisation of resources.
Implementation. • Buy in • Cost factor	Task Team. • Management: • Labour: • JO & MM:	HR Manager and Crewing Manager
Cost Savings Benefit		

Objective: *'Rebuilding relationships within National Ports Authority'*

Initiative: **Refocus on reason for existence**

Build teams by personal involvement

Support of Head Office via internal marketing exercise

Create opportunities to improve communication with all NPA departments

Positives	Negatives	Benefits
• Better understanding of NPA developments (opportunities). • Improved internal image. • Improved morale and teamwork. • Improved communication.		• Positioned to maximise opportunities.
Implementation • Teambuilding	Task Team. • Management: • Labour: • JO & MM	DS Manager , HR Manager, , GM Trade & Logistics, Corp. Comms. Manager
Cost Savings Benefit		

Objectives: *'Improve utilisation'*

Initiative: **Improve craft utilisation**

Positives	Negatives	Benefits
• Create capacity. • Reduce cost per cubic metre. • Improved focus on dredging production.	• Maintenance could be overlooked.	• Optimised craft utilisation.
Implementation •	Task Team. • Management: • Labour: • JO & MM	Durban Project Manager
Cost Savings Benefit		

3.2 A closer analysis of the repositioning opportunities identified that DS, as part of their current service offering, is already pursuing two of the opportunities. It would therefore not be correct to list these as "future repositioning opportunities" and they are therefore excluded from the list. These two are :

- Depth management to ports (2.4), and
- Dredging and surveying of dams (2.7).

3.3 In considering the ratings for each opportunity, as well as assessing the ability of DS to pursue the opportunities from a resource and timing perspective, it is recommended that the following sequencing be approved:

Opportunity	Year 1 (2007/08)	Year 2-3 (2008-10)	Year 4-5 (2010-12)	> Year 5 After 2012
2.3 Consultancy – Africa and internationally, including training	X			
2.5 (c) Provide Developed Skills – resources	X			
2.1 (a) Maintenance dredging in Africa	X			
2.4 Depth Management to ports	Continue			
2.7 Dredging and surveying of Dams	Continue			
2.9 Usability of Dredging Process By-products		X		
2.8 (a) Hydrographic Surveys – Africa		X		
2.11 Beach Nourishment		X		
2.5 (b) Provide Developed Skills – Hydro equipment		X		
2.2 (b) Capital Dredging (existing equipment)		X		
2.2 (a) Capital Dredging (new equipment)		X		
2.10 Sand Bypass System (operate and maintain)			X	
2.6 Submerged Foreign Object Recovery			X	
2.5 (a) Provide Developed Skills – Dredging equipment			X	
2.8 (b) Hydrographic Surveys – International			X	
2.1 (b) Maintenance dredging Internationally				X

3.4 It is further recommended that for each of the opportunities identified and included in Year 1, a business case be developed by the end of 2007, for submission to the Chief Executive of the TNPA for final approval. The business case can then be presented

during the budget review process (January 2007) to motivate inclusion of the opportunities in the Dredging business plan for 2007/08.

The business case will also assist in including the appropriate financial information in the financial analysis for the year in question, as well as to indicate the longer-term financial impact.

3.5 The path for DS to become a sustainable business unit has been shown to be clearly dependant on realising the asset replacement plan and pursuing external markets. All the initiatives recommended in this chapter will allow this. It is important to note that the asset replacement plan that I have developed has been accepted by the Chief Executive of Transnet National Ports Authority. Capital has been approved for the purchase of a new 4000m^3 TSHD at a cost of R444 million. Tenders close at the end of October 2007. R60m has also been approved for the refurbishment on the TSHD Ingwenya. DS by following the proposals outlined in this document are thus on the path to sustainability

ANNEXURE A

ANALYSIS OF REPOSITIONING OPPORTUNITIES

	Market Demand	Market Attractiveness	Invest-ment	Risk	Resources	Systems	Training	Total	
Weight	**30**	**20**	**15**	**15**	**10**	**5**	**5**	**100**	
2.1 a	1.2	0.8	0.3	0.45	0.4	0.25	0.15	3.55	8
2.1 b	0.3	0.4	0.15	0.15	0.3	0.25	0.05	1.60	16
2.2 a	1.2	0.6	0.15	0.15	0.1	0.25	0.05	2.50	15
2.2 b	12	0.8	0.3	0.3	0.3	0.25	0.15	3.30	11
2.3	1.2	0.8	0.75	0.75	0.5	0.25	0.15	4.40	2
2.4	1.2	1.0	0.75	0.6	0.5	0.25	0.15	4.45	1
2.5 a	0.6	0.4	0.75	0.15	0.5	0.25	0.25	2.90	13
2.5 b	0.9	0.6	0.75	0.15	0.5	0.25	0.25	3.40	10
2.5 c	1.2	0.8	0.75	0.75	0.5	0.15	0.25	4.40	2
2.6	0.3	0.2	0.75	0.75	0.5	0.25	0.25	3.00	12
2.7	0.6	0.6	0.75	0.75	0.5	0.25	0.25	3.70	7
2.8 a	0.9	0.6	0.75	0.6	0.4	0.25	0.25	3.75	6
2.8 b	0.6	0.4	0.6	0.3	0.3	0.25	0.25	2.70	14
2.9	1.2	0.6	0.3	0.75	0.5	0.25	0.25	3.85	4
2.10	0.9	0.8	0.75	0.75	0.4	0.2	0.05	3.85	4

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RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

UNIVERSITY OF
KWAZULU-NATAL

6 MARCH 2007

MR. CS GABRIEL (911308881)
GRADUATE SCHOOL OF BUSINESS

Dear Mr. Gabriel

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0833/06

I wish to confirm that ethical clearance has been granted for the following project:

"Compilation of a detailed business plan for dredging services, National Ports Authority of South Africa"

Yours faithfully

MS. PHUMELELE XIMBA
RESEARCH OFFICE

cc. Faculty Office (Christel Haddon)
cc. Supervisor (Prof. W Geach)